

OMRON



Components Catalogue



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Welcome to the Omron Components Catalogue

Omron Components is a world-class business delivering a wide range of high quality, high performance components utilising latest technologies and backed by full technical, applications and logistical support.

We offer the widest range of relays for power, signal and automotive applications as well as solid-state and MOSFET relays. Our G3VM MOSFETS combine the advantages of mechanical and solid-state technologies allowing design flexibility with either AC or DC load able to be connected in either direction. We are also developing our range of microsensors, and currently offer photomicrosensors and a new range of D8M-D8 micro pressure-sensors which meet stringent safety standards such as working reliably with low pressure, metal casing and flange fitting. Our broad range of switches includes micro, DIP, and tactile options, and you will find a wide selection of connectors to meet



industry-standard data interconnect, power transmission and signalling. Omron Double Reflection LEDs feature built-in optical light guide technology that more than doubles effective light output compared with conventional bullet-type LEDs.

Environmental research and experience enabled us to formulate a policy to remove recognised hazardous substances from our products well within the timescales of European Directives. We have identified suitable alternative materials and agreed the changes we need to make to our production processes in order to maintain quality levels. All of our manufacturing sites have achieved ISO14001 certification for the management of environmental protection in our organisation.



Using our website alongside this catalogue, you can be kept fully up-to-date with our range of products, technical capabilities and environmental policy.

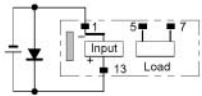
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Precautions

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.



Terminals

Since terminals are made of materials with high heat conduction, complete soldering (automatic or manual) within 10 seconds at a temperature of 260°C.

When fitting with a Socket, match properly and push straight down vertically.

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

■ Introduction

New models and a wider range provide an array of solutions, meeting the needs of today's high performance applications.

Our new range of MOSFET relays, Type G3VM, set the benchmark in Solid State Relays (SSRs). Products are manufactured using the latest advances in automated production and include a variety of improved construction technologies within the areas of the input LED, PDA (Photo Diode Array used as a photocoupler) and MOSFET chips used in the load switching circuit. As a result, further reductions in package size and power requirements have been achieved.

Combining the advantages of mechanical and solid state technology, the new G3VM range gives you unprecedented capability to design. All models featured include a double MOSFET load circuit, enabling the designer complete versatility since it makes no difference whether an AC or DC load in either direction is connected (Connection A). Thus, the MOSFET relay is a fully functional alternative to an electromechanical relay with minimal additional drive circuitry.

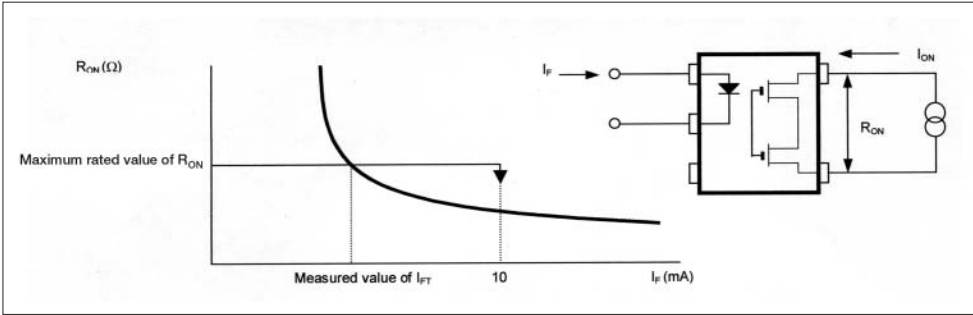
The built-in Current Limit Function (CLR models) has many uses. Traditionally used to clamp excessive over current fault conditions in telecom equipment, this feature can also be used to good effect to resist transient and short circuit conditions.

MOSFET relays are the ideal data and telecommunication solution for line seizing, line switching, hook switching, Data Access Arrangement (DAA) function, line transformer circuit control and other feature phone functions. Central office applications require high reliability and long life. Here G3VM is ideal for use in the areas of Subscriber Line Interfaces (SLICs) Multiplexers and Routers. In addition, Local Area Networks (LANs) and Network Termination Units (NTUs) including Set-Top Boxes (STBs) and Remote Metering Systems (RMS) can take advantage of the G3VMs' small size and low ON resistance.

Advances in performance and cost reduction enable MOSFET relays to be considered as good alternatives to Reed Relays in application areas such as security motion detectors (standard and anti-mask PIRs), other surveillance alarm equipment and associated systems.

■ Glossary

| Term | Symbol | Description |
|--|----------------------|---|
| LED forward current | I _F | Rated current that can flow continuously in the forward direction of the LED |
| Repetitive peak LED forward current | I _{FP} | Rated current that can flow momentarily in the forward direction of the LED |
| LED forward current reduction rate | <I _{ON} /°C | Rated change of forward current flowing through the LED relative to ambient temperature above 25 °C |
| LED reverse voltage | V _R | Rated reverse voltage that can be applied between the anode and the cathode |
| Connection temperature | T _J | Rated temperature that can be allowed in the junction of the LED, Photodetector or MOSFET(s) |
| Output dielectric strength | V _{OFF} | Rated voltage that can be applied between the MOSFET's output terminals in the OFF state |
| Continuous load current | I _O | Rated current that can flow between the MOSFET's output terminals in the ON state |
| ON current reduction rate | <I _{ON} /°C | Rated change of load current flowing between MOSFET(s) output terminals relative to ambient temperature above 25 °C |
| Dielectric strength between input and output | V _{I-O} | Isolation voltage between input and output terminals for a specified time |
| Operating temperature | T _a | Ambient temperature range in which the relay may be operated without impairment |
| Storage temperature | T _{stg} | Ambient temperature range in which the relay may be stored while not operating |
| LED forward voltage | V _F | Voltage drop between the LED's anode and cathode at a certain forward current |
| LED reverse current | I _R | Leakage current flowing in the LED's reverse direction (between cathode and anode) |
| Capacity between LED terminals | C _T | Electrostatic capacitance between the anode and the cathode terminals of the LED |
| Trigger LED forward current | I _{FT} | Minimum value of input current necessary to put the output MOSFET(s) in to the ON state |
| Maximum resistance with output ON | R _{ON} | Resistance between the MOSFET's output terminals specified with reference to ON state current |
| Current leakage when the relay is open | I _{LEAK} | Leakage current flowing between the MOSFET's output terminals in the OFF state |
| Capacity between I/O terminals | C _{I-O} | Electrostatic capacitance between the input and output terminals of the relay |
| Insulation resistance | R _{I-O} | Resistance between the input and output terminals at the specified voltage value |
| Turn-ON time | t _{ON} | Time required for the output waveform to change from 0(100%) to 90(10%) after input goes from OFF to ON state |
| Turn-OFF time | t _{OFF} | Time required for the output waveform to change from 90(10%) to 0(100%) after input goes from ON to OFF state |
| Output dielectric strength | V _{DD} | Rated load voltage that can be applied between the MOSFET's output terminals |



Relationship between R_{ON} and I_{FT}

PRECAUTIONS WHEN MOUNTING DEVICES ON PCBS

Soldering

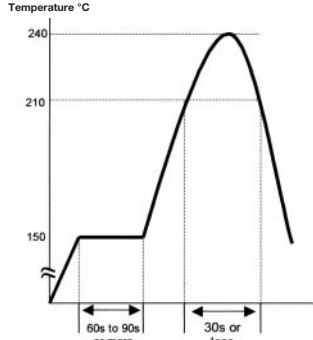
As far as it is possible, avoid raising the temperature of the device by observing the following restrictions.

Soldering leads directly

260°C max, 10 seconds max

Reflow soldering

- a) Lead temperature: 210°C max, 30 seconds max
Atmospheric temperature close of mold body surface: 240°C max, 10 seconds max
- b) Recommended temperature profile



c) Precautions when heating

The soldering time (as shown above) must be kept as short as possible.
When using a halogen lamp or infrared heater, please do not irradiate the mold body surface directly.

Dip soldering (flow soldering)

Reflow soldering is recommended because the thermal stress involved is much less than that inherent in other soldering methods.
If you plan to use dip soldering, please contact OMRON first.

Cleaning

When ions in the flux enter into the product during soldering, fluctuation in device performance or corrosion may occur. Be sure to wash away any flux residue which contains Cl⁻ or Na ions.

The following types of solvents are recommended for cleaning the flux

- Asahi Clean AK-225AES
- Kao Cleanthru 750H
- Pine-Alpha ST-100S

Cleaning Conditions

Cleaning conditions and precautions may vary according to product specifications.

a) General precautions for dip cleaning

Dipping time varies according to the solvent used.
However, as a general guideline, it is recommended that the dip time be limited to three minutes.

b) General precautions for ultrasonic cleaning

When ultrasonic cleaning is conducted for an excessively long time, contact between the product resin and the metal leads may lessen. Also, excessive ultrasonic stress may cause cracks in the pellet.
It is recommended that the applied stress be minimized.

Recommended conditions for standard ultrasonic cleaning

- Frequency: 27kHz to 29kHz
- Output: 0.25 W/cm² or less
- Time: 30 seconds or less
- Temperature: 50°C (may vary according to the type of solvent used)

Cleaning must be conducted with the printed circuit board or device floating on the solvent, so as to avoid direct contact between the PCB or device and the ultrasonic vibrator.

Handling Precautions

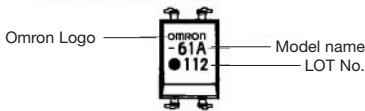
Do not touch the device's mark-bearing surface with your hand or with a brush while cleaning or applying cleaning liquid to the device. This may erase device markings. It is important to confirm that neither the solvent used for cleaning nor the cleaning conditions will damage the device package.

Precautions

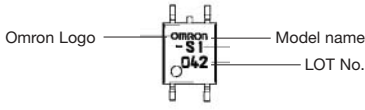
- WARNING**
Be sure to turn OFF the power when wiring the relay, otherwise an electric shock may be received.
- WARNING**
Do not touch the charged terminals of the SSR, otherwise an electric shock may be received.
- CAUTION**
Do not apply overvoltage or overcurrent to the I/O circuits of the SSR, otherwise the SSR may malfunction or burn.
- CAUTION**
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.
- CAUTION**
Electrostatic sensitive devices. Keep in original packaging until required to use. Avoid touching device terminals. Take static handling precautions during processing.

Appearance Examples

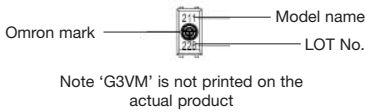
DIP (Dual In-line Package)



SOP (Small Outline Package)

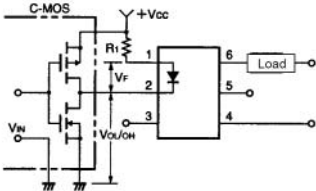


SSOP (Shrink Small Outline Package)

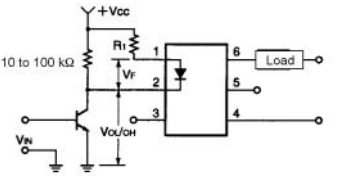


Typical Relay Driving Circuit Examples

C-MOS



Transistor



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

$$R_1 = \frac{V_{CC} - V_{OL} - V_F(ON)}{5 \text{ to } 20 \text{ mA}}$$

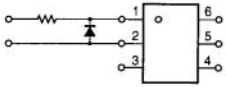
Use the following formula to obtain the LED forward voltage value to assure that the relay releases accurately.

$$V_F(OFF) = V_{CC} - V_{OH} < 0.8 \text{ V}$$

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.

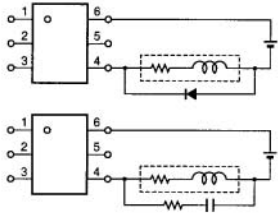
Surge Voltage Protection Circuit Example



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 (6-PIN MODELS ONLY)

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 a relay for automatic mounting must not exceed the following.

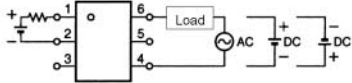


In direction A: 1.96 N
In direction B: 1.96 N

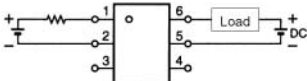
LOAD CONNECTION

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

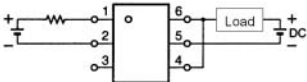
AC Connection



DC Single Connection



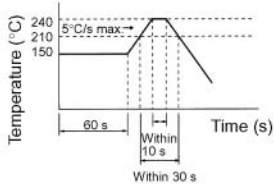
DC Parallel Connection



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.
 - b. 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.



| Style | | | Through-hole Device – 4 pin | | | | | | Surface Mount Device – 4 pin | | | | |
|---|-----------------------------------|---------|-----------------------------|--------|---------|-----------------|--------|--------|------------------------------|--------|---------|-----------------|------|
| | | | | | | | | | | | | | |
| Dimensions (L x W x H mm) | | | 7.62 x 4.58 x 3.65 | | | | | | 7.62 x 4.58 x 3.65 | | | | |
| Type | | | General Purpose | | Telecom | General Purpose | | | General Purpose | | Telecom | General Purpose | |
| Part Number (G3VM-) | | | -61A1 | -351A | -2L | -353A | -401A | -61D1 | -351D | -2FL | -353D | -401D | |
| Output | Load Voltage | | 60 V | 350 V | 350 V | 350 V | 400 V | 60 V | 350 V | 350 V | 350 V | 400 V | |
| | Function | | 1a | 1a | 1a CLF | 1b | 1a | 1a | 1a | 1a CLF | 1b | 1a | |
| | Cont. load current (connection A) | | 500 mA | 120 mA | 120 mA | 150 mA | 120 mA | 500 mA | 120 mA | 120 mA | 150 mA | 120 mA | |
| | ON resistance | Typical | 1 Ω | 35 Ω | 22 Ω | 15 Ω | 18 Ω | 1 Ω | 35 Ω | 22 Ω | 15 Ω | 18 Ω | |
| Max. | | 2 Ω | 50 Ω | 35 Ω | 25 Ω | 35 Ω | 2 Ω | 50 Ω | 35 Ω | 25 Ω | 35 Ω | | |
| Input | LED forward current (max) | | 50 mA | | | | | | 50 mA | | | | |
| | LED reverse voltage (max) | | 5 V | | 6 V | 5 V | | | 5 V | | 6 V | 5 V | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA |
| | | Max. | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.3 ms | – | 1 ms | – | 0.8 ms | 0.3 ms | – | 1 ms | – | |
| | | Max. | 2 ms | 1 ms | 1 ms | 1 ms | 1 ms | 2 ms | 1 ms | 1 ms | 1 ms | 1 ms | |
| | Turn-off Time | Typical | 0.1 ms | 0.1 ms | – | 1 ms | – | 0.1 ms | 0.1 ms | – | 1 ms | – | |
| | | Max. | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | |
| Dielectric Strength between I/O terminals | | | 2,500 VAC | | | | | | 2,500 VAC | | | | |
| Temperature | Operating | | -40°C to 85°C | | | | | | -40°C to 85°C | | | | |
| | Storage | | -55°C to 125°C | | | | | | -55°C to 125°C | | | | |
| Floating capacity between I/O terminals | | | 0.8 pF | | | | | | 0.8 pF | | | | |
| Insulation resistance | | | 1,000 MΩ | | | | | | 1,000 MΩ | | | | |
| Page | | | 358 | 362 | 360 | 364 | 366 | 358 | 362 | 360 | 364 | 366 | |

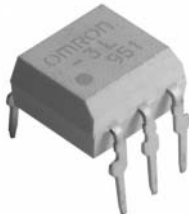
Selection Guide – MOSFET Relays



| Style | | | Small Outline Package – 4 pin | | | | | |
|---|-----------------------------------|---------|---|--------|-------|--------|--------|--------|
| | | |  | | | | | |
| Dimensions (L x W x H mm) | | | 7 x 3.9 x 2.1 | | | | | |
| Type | | | General Purpose | | | | | |
| Part Number (G3VM-) | | | -61G1 | -81G1 | -201G | -351G | -353G | -401G |
| Output | Load Voltage | | 60 V | 80 V | 200 V | 350 V | 350 V | 400 V |
| | Function | | 1a | 1a | 1a | 1a | 1b | 1a |
| | Cont. load current (connection A) | | 400 mA | 350 mA | 50 mA | 110 mA | 120 mA | 120 mA |
| | ON resistance | Typical | 1 Ω | 1 Ω | 40 Ω | 35 Ω | 15 Ω | 17 Ω |
| | | Max. | 2 Ω | 1.2 Ω | 50 Ω | 50 Ω | 25 Ω | 35 Ω |
| Input | LED forward current (max) | | 50 mA | | | | | |
| | LED reverse voltage (max) | | 5 V | | | | | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA |
| | | Max. | 3 mA | 4 mA | 3 mA | 3 mA | 3 mA | 3 mA |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.3 ms | – | 1 ms | – | 0.3 ms |
| | | Max. | 2 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms |
| | Turn-off Time | Typical | 0.1 ms | 0.1 ms | – | 1 ms | – | 0.1 ms |
| | | Max. | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms |
| Dielectric Strength between I/O terminals | | | 1,500 VAC | | | | | |
| Temperature | Operating | | -40°C to 85°C | | | | | |
| | Storage | | -55°C to 125°C | | | | | |
| Floating capacity between I/O terminals | | | 0.8 pF | | | | | |
| Insulation resistance | | | 1,000 MΩ | | | | | |
| Page | | | 368 | 370 | 372 | 374 | 376 | 378 |


Selection Guide – MOSFET Relays



| Style | | Through-hole Device – 6 pin | | | | | | | | | |
|---|-----------------------------------|---|--------------------------|--------------------|---------|-----------------|--------|--------------------------|--------------------|------------|--------|
| | |  | | | | | | | | | |
| Dimensions (L x W x H mm) | | 7.62 x 7.12 x 3.65 | 7.62 x 8.64 x 3.65 | 7.62 x 7.12 x 3.65 | | | | 7.62 x 8.64 x 3.65 | 7.62 x 7.12 x 3.65 | | |
| Type | | General Purpose | High Performance | General Purpose | Telecom | General Purpose | | High Performance | Telecom | | |
| Part Number (G3VM-) | | -61B1 | -XN | -351B | -3L | -353B | -401B | -4N | -401BY | -601BY | |
| Output | Load Voltage | 60 V | 60 V | 350 V | 350 V | 350 V | 400 V | 400 V | 400 V | 600 V | |
| | Function | 1a | 1a hiperf | 1a | 1a CLF | 1b | 1a | 1a hiperf | 1a hi isol | 1a hi isol | |
| | Cont. load current (connection A) | | 500 mA | 300 mA | 120 mA | 120 mA | 150 mA | 120 mA | 150 mA | 120 mA | 100 mA |
| | ON resistance | Typical | 1 Ω | 1.4 Ω | 25 Ω | 22 Ω | 15 Ω | 17 Ω | – | 17 Ω | 25 Ω |
| | | Max. | 2 Ω | 2 Ω | 35 Ω | 35 Ω | 25 Ω | 35 Ω | 12 Ω | 35 Ω | 35 Ω |
| Input | LED forward current (max) | | 50 mA | 30 mA | 50 mA | | | | 30 mA | 50 mA | |
| | LED reverse voltage (max) | | 5 V | | | | | | | | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | – | 1 mA | 1 mA | 1 mA | – | 1.6 mA |
| | | Max. | 3 mA | 5 mA | 3 mA | 3 mA | 3 mA | 3 mA | 5 mA | 3 mA | 5 mA |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.2 ms | 0.3 ms | – | 0.1 ms | 0.3 ms | 0.3 ms | 0.3 ms | 0.2 ms |
| | | Max. | 2 ms | 0.5 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1.5 ms |
| | Turn-off Time | Typical | 0.1 ms | 0.2 ms | 0.1 ms | – | 1 ms | 0.1 ms | 0.3 ms | 0.1 ms | 0.2 ms |
| | | Max. | 0.5 ms | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms | 1 ms | 1 ms |
| Dielectric Strength between I/O terminals | | 2,500 VAC | | | | | | | 5,000 VAC | | |
| Temperature | Operating | -40°C to 85°C | | | | | | | | | |
| | Storage | -55°C to 125°C | | | | | | | | | |
| Floating capacity between I/O terminals | | 0.8 pF | | | | | | | | | |
| Insulation resistance | | 1,000 MΩ | | | | | | | | | |
| Page | | 380 | 382 | 385 | 387 | 389 | 391 | 393 | 396 | 398 | |



Selection Guide – MOSFET Relays





| Style | | | Surface Mount Device – 6 pin | | | | | | | | |
|---|-----------------------------------|---------|---|--------------------------|--------------------|---------|-----------------|--------------------------|--------------------|------------|------------|
| | | |  | | | | | | | | |
| Dimensions (L x W x H mm) | | | 7.62 x 7.12 x 3.65 | 7.62 x 8.64 x 3.65 | 7.62 x 7.12 x 3.65 | | | 7.62 x 8.64 x 3.65 | 7.62 x 7.12 x 3.65 | | |
| Type | | | General Purpose | High Performance | General Purpose | Telecom | General Purpose | | High Performance | Telecom | |
| Part Number (G3VM-) | | | -61E1 | -XNF | -351E | -3FL | -353E | -401E | -4NF | -401EY | -601EY |
| Output | Load Voltage | | 60 V | 60 V | 350 V | 350 V | 350 V | 400 V | 400 V | 400 V | 600 V |
| | Function | | 1a | 1a hiperf | 1a | 1a CLF | 1b | 1a | 1a hiperf | 1a hi isol | 1a hi isol |
| | Cont. load current (connection A) | | 500 mA | 300 mA | 120 mA | 120 mA | 150 mA | 120 mA | 150 mA | 120 mA | 100 mA |
| | ON resistance | Typical | 1 Ω | 1.4 Ω | 25 Ω | 22 Ω | 15 Ω | 17 Ω | 8 Ω | 17 Ω | 22 Ω |
| Max. | | 2 Ω | 2 Ω | 30 Ω | 35 Ω | 25 Ω | 35 Ω | 12 Ω | 35 Ω | 35 Ω | |
| Input | LED forward current (max) | | 50 mA | 30 mA | 50 mA | | | 30 mA | 50 mA | | |
| | LED reverse voltage (max) | | 5 V | | | | | | | | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | – | 1 mA | 1 mA | 1 mA | – | 1.6 mA |
| | | Max. | 3 mA | 5 mA | 3 mA | 3 mA | 3 mA | 3 mA | 5 mA | 3 mA | 5 mA |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.2 ms | 0.3 ms | – | 0.1 ms | 0.3 ms | 0.3 ms | 0.3 ms | 0.5 ms |
| | | Max. | 2 ms | 0.5 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1.5 ms |
| | Turn-off Time | Typical | 0.1 ms | 0.2 ms | 0.1 ms | – | 1 ms | 0.1 ms | 0.3 ms | 0.1 ms | 0.1 ms |
| | | Max. | 0.5 ms | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms | 1 ms | 1 ms |
| Dielectric Strength between I/O terminals | | | 2,500 VAC | | | | | | | 5,000 VAC | |
| Temperature | Operating | | -40°C to 85°C | | | | | | | | |
| | Storage | | -55°C to 125°C | | | | | | | | |
| Floating capacity between I/O terminals | | | 0.8 pF | | | | | | | | |
| Insulation resistance | | | 1,000 MΩ | | | | | | | | |
| Page | | | 380 | 382 | 385 | 387 | 389 | 391 | 393 | 396 | 398 |

Selection Guide – MOSFET Relays

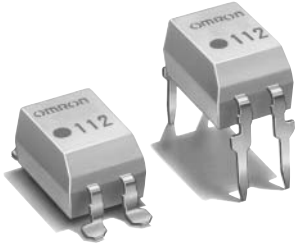


| Style | | | Small Outline Package – 6 pin | | | | | | Through-hole Device – 8 pin | | | | | |
|---|-----------------------------------|---------|---|--------|--------|--------|--------|--------|---|--------|---------|-----------------|--------|--|
| | | |  | | | | | |  | | | | | |
| Dimensions (L x W x H mm) | | | 7.0 x 6.3 x 2.1 | | | | | | 7.62 x 9.66 x 3.65 | | | | | |
| Type | | | General Purpose | | | | | | General Purpose | | Telecom | General Purpose | | |
| Part Number (G3VM-) | | | -61H1 | -201H1 | -351H | -353H | -401H | -62C1 | -352C | -WL | -354C | -355C | -402C | |
| Output | Load Voltage | | 60 V | 200 V | 350 V | 350 V | 400 V | 60 V | 350 V | 350 V | 350 V | 350 V | 400 V | |
| | Function | | 1a | 1a | 1a | 1b | 1a | 2a | 2a | 2a CLF | 2b | 1c | 2a | |
| | Cont. load current (connection A) | | 400 mA | 200 mA | 110 mA | 120 mA | 120 mA | 500 mA | 120 mA | 120 mA | 150 mA | 100 mA | 120 mA | |
| | ON resistance | Typical | 1 Ω | 5 Ω | 25 Ω | 15 Ω | 17 Ω | 1 Ω | 25 Ω | 22 Ω | 15 Ω | 30 Ω | 18 Ω | |
| Max. | | 2 Ω | 8 Ω | 35 Ω | 25 Ω | 35 Ω | 2 Ω | 50 Ω | 35 Ω | 25 Ω | 35 Ω | 35 Ω | | |
| Input | LED forward current (max) | | 50 mA | | | | | | 50 mA | | | | | |
| | LED reverse voltage (max) | | 5 V | | | | | | 5 V | | 6 V | 5 V | | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA | |
| | | Max. | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.6 ms | 0.3 ms | – | 0.3 ms | 0.8 ms | 0.3 ms | – | 0.1 ms | 0.3 ms | – | |
| | | Max. | 2 ms | 1.5 ms | 1 ms | 1 ms | 1 ms | 2 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | |
| | Turn-off Time | Typical | 0.1 ms | 0.1 ms | 0.1 ms | – | 0.1 ms | 0.1 ms | 0.1 ms | – | 1 ms | 0.15 ms | – | |
| | | Max. | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms | |
| Dielectric Strength between I/O terminals | | | 1,500 VAC | | | | | | 2,500 VAC | | | | | |
| Temperature | Operating | | -40°C to 85°C | | | | | | -40°C to 85°C | | | | | |
| | Storage | | -55°C to 125°C | | | | | | -55°C to 125°C | | | | | |
| Floating capacity between I/O terminals | | | 0.8 pF | | | | | | 0.8 pF | | | | | |
| Insulation resistance | | | 1,000 MΩ | | | | | | 1,000 MΩ | | | | | |
| Page | | | 400 | 402 | 404 | 406 | 408 | 410 | 412 | 414 | 416 | 418 | 420 | |

| Style | | Surface Mount Device – 8 pin | | | | | | Small Outline Package – 8 pin | | | | | | |
|---|-----------------------------------|---|--------|----------|-----------------|--------|---------|--|--------|--------|--------|-------|--------|--------|
| | |  | | | | | |  | | | | | | |
| Dimensions (L x W x H mm) | | 7.62 x 9.66 x 3.65 | | | | | | 7 x 9.4 x 2.1 | | | | | | |
| Type | | General Purpose | | Tele-com | General Purpose | | | General Purpose | | | | | | |
| Part Number (G3VM-) | | -62F1 | -352F | -WFL | -354F | -355F | -402F | -62J1 | -202J1 | -352J | -354J | -355J | -402J | |
| Output | Load Voltage | 60 V | 350 V | 350 V | 350 V | 350 V | 400 V | 60 V | 200 V | 350 V | 350 V | 350 V | 400 V | |
| | Function | 2a | 2a | 2a CLF | 2b | 1c | 2a | 2a | 2a | 2a | 2b | 1c | 2a | |
| | Cont. load current (connection A) | | 500mA | 120mA | 120mA | 150mA | 100mA | 120mA | 400mA | 200mA | 110mA | 120mA | 90mA | 120mA |
| | ON resistance | Typical | 1 Ω | 25 Ω | 22 Ω | 15 Ω | 30 Ω | 18 Ω | 1 Ω | 5 Ω | 35 Ω | 15 Ω | 30 Ω | 17 Ω |
| | | Max. | 2 Ω | 50 Ω | 35 Ω | 25 W | 35 Ω | 35 Ω | 2 Ω | 8 Ω | 50 Ω | 25 Ω | 35 Ω | 35 Ω |
| Input | LED forward current (max) | | 50 mA | | | | | | 50 mA | | | | | |
| | LED reverse voltage (max) | | 5 V | | 6 V | 5 V | | | 5 V | | | | | |
| | Trigger LED current | Typical | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1.6 mA | 1 mA | 1 mA | 1 mA | 1 mA | 1 mA |
| | | Max. | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA | 3 mA |
| Switching Characteristics | Turn-on Time | Typical | 0.8 ms | 0.3 ms | – | 0.1 ms | 0.3 ms | – | 0.8 ms | 0.6 ms | 0.3 ms | – | 0.3 ms | 0.3 ms |
| | | Max. | 2 ms | 1 ms | 1 ms | 1 ms | 1 ms | 1 ms | 2 ms | 1.5 ms | 1 ms | 1 ms | 1 ms | 1 ms |
| | Turn-off Time | Typical | 0.1 ms | 0.1 ms | – | 1 ms | 0.15 ms | – | 0.1 ms | 0.1 ms | 0.1 ms | – | 0.15ms | 0.1 ms |
| | | Max. | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms | 0.5 ms | 1 ms | 1 ms | 3 ms | 1 ms | 1 ms |
| Dielectric Strength between I/O terminals | | 2,500 VAC | | | | | | 1,500 VAC | | | | | | |
| Temperature | Operating | -40°C to 85°C | | | | | | -40°C to 85°C | | | | | | |
| | Storage | -55°C to 125°C | | | | | | -55°C to 125°C | | | | | | |
| Floating capacity between I/O terminals | | 0.8 pF | | | | | | 0.8 pF | | | | | | |
| Insulation resistance | | 1,000 MΩ | | | | | | 1,000 MΩ | | | | | | |
| Page | | 410 | 412 | 414 | 416 | 418 | 420 | 422 | 424 | 426 | 428 | 430 | 432 | |

Compact, General-purpose, Analog switching MOSFET Relay, with Dielectric Strength of 2.5 kVAC between I/O Using Optical Isolation

- Upgraded G3VM-61 A/D Series.
- Switches minute analog signals.
- Leakage current of 1 A max. when output relay is open.



NEW

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

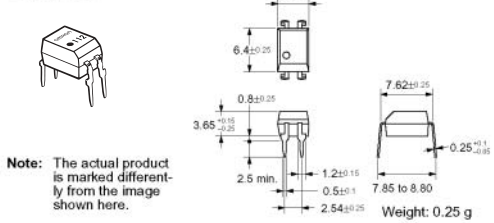
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 60 VAC | G3VM-61A1 | 100 | --- |
| | Surface-mounting terminals | | G3VM-61D1 | | |
| | | | G3VM-61D1(TR) | --- | 1,500 |

Dimensions

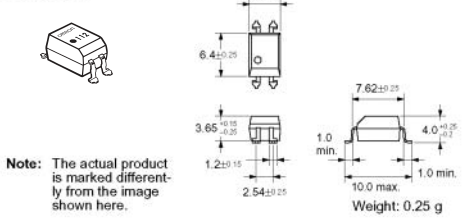
Note: All units are in millimeters unless otherwise indicated.

G3VM-61A1



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

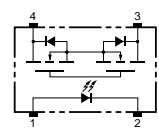
G3VM-61D1



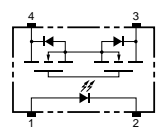
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-61A1

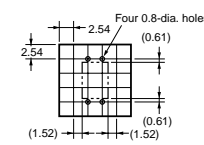


G3VM-61D1



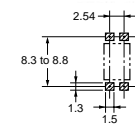
PCB Dimensions (Bottom View)

G3VM-61A1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-61D1



■ Absolute Maximum Ratings (Ta = 25°C)

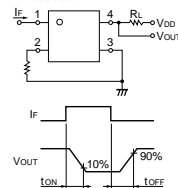
| | Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|-------------|----------------------------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| Output | Output dielectric strength | V_{OFF} | 60 | V | |
| | Continuous load current | I_O | 500 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -5.0 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| Dielectric strength between input and output (See note 1.) | | V_{I-O} | 2,500 | V _{rms} | AC for 1 min |
| Operating temperature | | T_a | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation |
| Storage temperature | | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation |
| Soldering temperature (10 s) | | --- | 260 | $^\circ\text{C}$ | 10 s |

Note: 1. 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.

■Electrical Characteristics (Ta = 25°C)

| | Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10 \text{ mA}$ |
| | Reverse current | I_R | — | — | 10 | μA | $V_R = 5 \text{ V}$ |
| | Capacity between terminals | C_T | — | 30 | — | pF | $V = 0, f = 1 \text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | — | 1.6 | 3 | mA | $I_O = 500 \text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | — | 1 | 2 | Ω | $I_F = 5 \text{ mA}$ $I_O = 500 \text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | — | — | 1.0 | μA | $V_{OFF} = 60 \text{ V}$ |
| Capacity between I/O terminals | | C_{LO} | — | 0.8 | — | pF | $f = 1 \text{ MHz}, V_S = 0 \text{ V}$ |
| Insulation resistance | | R_{LO} | 1,000 | — | — | M Ω | $V_{LO} = 500 \text{ VDC}$, $\text{RoH} \geq 60\%$ |
| Turn-ON time | | t_{ON} | — | 0.6 | 2.0 | ms | $I_F = 5 \text{ mA}, R_L = 200 \Omega$ |
| Turn-OFF time | | t_{OFF} | — | 0.1 | 0.5 | ms | $V_{DD} = 20 \text{ V}$ (See note 2.) |

Note: 2. Turn-ON and Turn-OFF



■ Recommended Operating Conditions

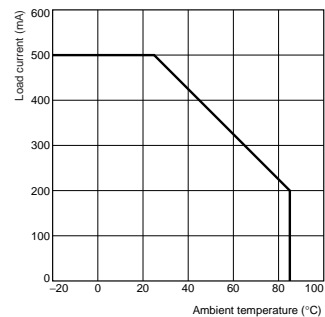
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 500 | mA |
| Operating temperature | T_A | -20 | --- | 85 | °C |

■ Engineering Data

Load Current vs. Ambient Temperature

G3VM-61A1(D1)



Analog-switching MOSFET Relays with 350-V Load Voltage and Current Limit.

- A 4-pin Relay available with the same terminal-pin position as 4-pin photocouplers.
- Approved standards: UL1577 (File No. E80555)



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

■ Application Examples

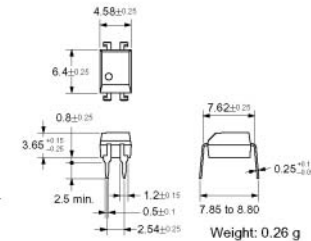
- Electronic automatic exchange systems
- Cordless telephones
- Multi-functional telephones
- Measurement devices

■ List of Models

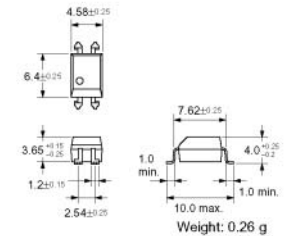
| Contact form | Terminals | Load voltage (peak value) | Model | Current limit | Number per stick | Number per tape |
|--------------|-------------------------------|------------------------------|--------------|---------------|---------------------|--------------------|
| SPST-NO | PCB terminals | 350 VAC | G3VM-2L | Yes | 100 | --- |
| | Surface-mounting terminals | | G3VM-2FL | | --- | 1,500 |
| | | | G3VM-2FL(TR) | | | |

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



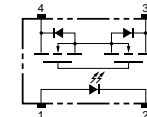
Note: The actual product is marked differently from the image shown here.



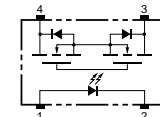
Note: The actual product is marked differently from the image shown here.

■ Terminal Arrangement/Internal Connections (Top View)

G3VM-2L

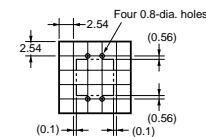


G3VM-2FL



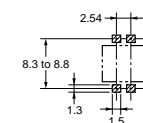
■ PCB Dimensions (Bottom View)

G3VM-2L



■ Actual Mounting Pad Dimensions
(Recommended Value, Top View)

G3VM-2FL



Absolute Maximum Ratings (Ta = 25°C)

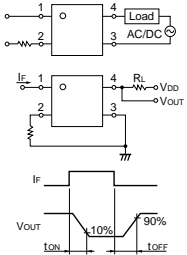
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|---------------------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/\text{°C}$ | ~0.5 | mA/°C |
| | LED reverse voltage | V_R | 8 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/\text{°C}$ | ~1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms |
| Operating temperature | T_a | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | T_{stg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | --- | 260 | °C | 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 6\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 120\text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 22 | 35 | Ω | $I_F = 5\text{ mA}$ $I_O = 120\text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 350\text{ V}$ |
| Limit current | | I_{LM} | 150 | --- | 300 | mA | $I_F = 5\text{ mA}, V_{DD} = 5\text{ V}, t = 5\text{ ms}$ |
| Capacity between I/O terminals | | C_{IO} | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | M Ω | $V_{IO} = 500\text{ VDC}, RoH \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega, V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | --- | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

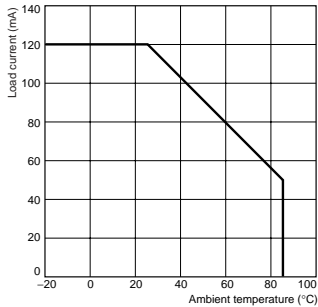
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{OD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

Engineering Data

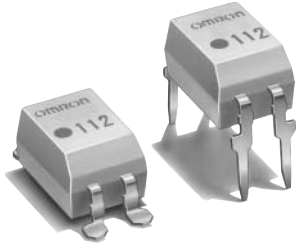
Load Current vs. Ambient Temperature

G3VM-2(F)L



New Standard Series with 350-V Load

- Upgraded G3VM-2 Series.
- Continuous load current of 120 mA.
- Dielectric strength of 2,500 Vrms between I/O.
- Operating time of 0.3 ms (typical)



NEW

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

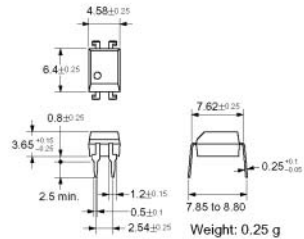
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 350 VAC | G3VM-351A | 100 | --- |
| | Surface-mounting terminals | | G3VM-351D | --- | --- |
| | | | G3VM-351D(TR) | --- | 1,500 |

Dimensions

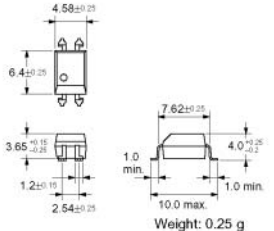
Note: All units are in millimeters unless otherwise indicated.

G3VM-351A



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

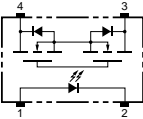
G3VM-351D



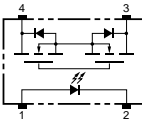
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-351A

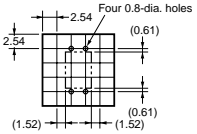


G3VM-351D



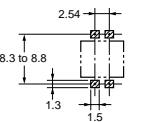
PCB Dimensions (Bottom View)

G3VM-351A



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-351D



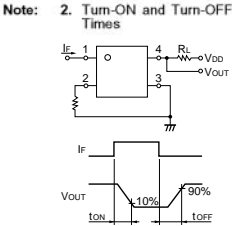
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | V_{IO} 2,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|---------------|--|------------|---------|---------|------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | 10 | µA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| | Maximum resistance with output ON | R_{ON} | --- | 25 | 35 | Ω |
| Output | Current leakage when the relay is open | I_{LEAK} | --- | 35 | 50 | Ω |
| | | | --- | 1.0 | µA | $V_{OFF} = 350\text{ V}$ |
| | Capacity between I/O terminals | C_{IO} | --- | 0.8 | pF | $f = 1\text{ MHz}, V_s = 0\text{ V}$ |
| | Insulation resistance | R_{IO} | 1,000 | --- | MΩ | $V_{IO} = 500\text{ VDC}, R_{oH} \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms |



Recommended Operating Conditions

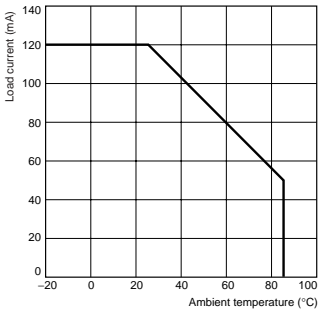
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-351A(D)

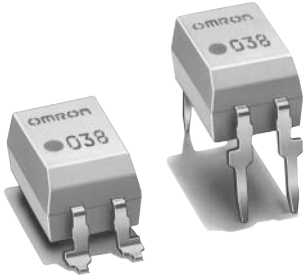


Analog-switching MOSFET Relay with SPST-NC (Single-pole, Single-throw, Normally Closed) Contacts

- Switches minute analog signals.
- Switching AC and DC.

Application Examples

- Electronic automatic exchange systems
- Security systems
- Datacom (modem) systems
- FA systems
- Measurement devices



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

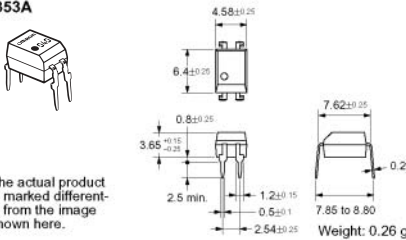
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NC | PCB terminals | 350 VAC | G3VM-353A | 100 | --- |
| | Surface-mounting terminals | | G3VM-353D | | |
| | | | G3VM-353D(TR) | | |

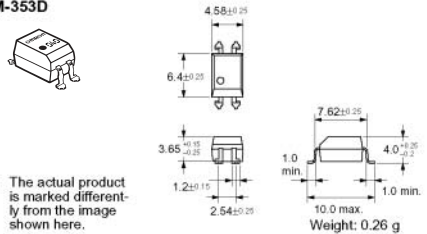
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-353A

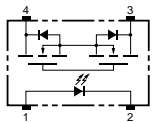


G3VM-353D

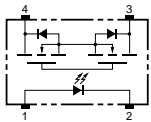


Terminal Arrangement/Internal Connections (Top View)

G3VM-353A

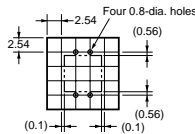


G3VM-353D



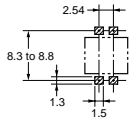
PCB Dimensions (Bottom View)

G3VM-353A



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-353D



Absolute Maximum Ratings (Ta = 25°C)

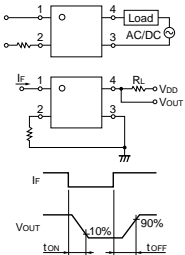
| Item | | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|-------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C | Ta \geq 25°C |
| | LED reverse voltage | V_R | 5 | V | |
| | Connection temperature | T_J | 125 | °C | |
| Output | Output dielectric strength | V_{OFF} | 350 | V | |
| | Continuous load current | I_O | 150 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.5 | mA/°C | Ta \geq 25°C |
| | Connection temperature | T_J | 125 | °C | |
| Dielectric strength between input and output (See note 1.) | | V_{IO} | 2,500 | Vrms | AC for 1 min |
| Operating temperature | | T_a | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | | T_{stg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | | --- | 260 | °C | 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10$ mA |
| | Reverse current | I_R | --- | --- | 10 | μ A | $V_R = 5$ V |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0$, $f = 1$ MHz |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_{OFF} = 10$ μ A |
| Output | Maximum resistance with output ON | R_{ON} | --- | 15 | 25 | Ω | $I_O = 150$ mA |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μ A | $I_F = 5$ mA, $V_{OFF} = 350$ V |
| Capacity between I/O terminals | | C_{IO} | --- | 0.8 | --- | pF | $f = 1$ MHz, $V_s = 0$ V |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | M Ω | $V_{IO} = 500$ VDC, $RoH \geq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.1 | 1.0 | ms | $I_F = 5$ mA, $R_L = 200$ Ω , $V_{DD} = 20$ V (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | 1.0 | 3.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

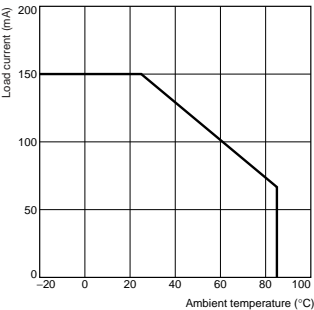
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | --- | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 150 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

Engineering Data

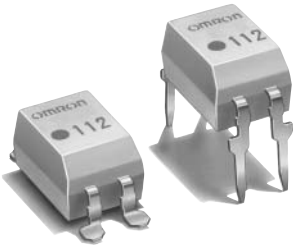
Load Current vs. Ambient Temperature

G3VM-353A(D)



Expanded Range of Analog-switching MOSFET Relays with 400-V Load Voltage

- A 4-pin Relay now available in the 400-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 2,500 Vrms between I/O.



NEW Approval pending

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

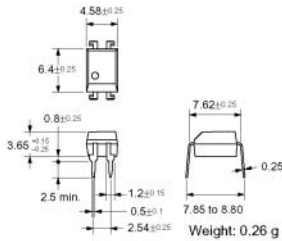
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 400 VAC | G3VM-401A | 100 | --- |
| | Surface-mounting terminals | | G3VM-401D | | |
| | | | G3VM-401D(TR) | --- | 1,500 |

Dimensions

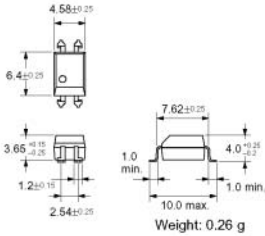
Note: All units are in millimeters unless otherwise indicated.

G3VM-401A



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

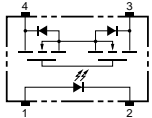
G3VM-401D



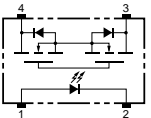
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-401A

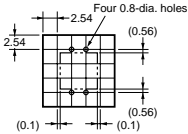


G3VM-401D



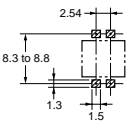
PCB Dimensions (Bottom View)

G3VM-401A



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-401D



Absolute Maximum Ratings (Ta = 25°C)

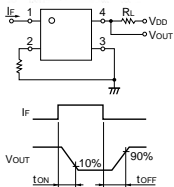
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 400 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 2,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | µA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 18 | 35 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | µA |
| | Capacity between I/O terminals | C_{I-O} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | --- | 1.0 | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

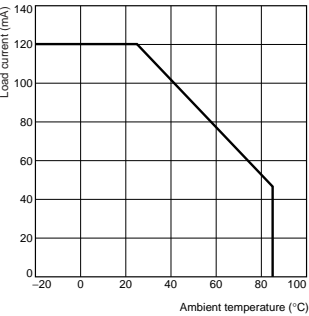
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

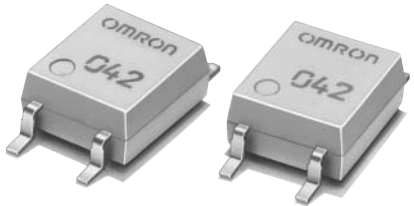
Load Current vs. Ambient Temperature

G3VM-401A(D)



New MOSFET Relay Designed for Switching Minute Signals and Analog Signals

- Upgraded G3VM-S1 Series.
- Continuous load current of 400 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Data loggers
- Measurement devices
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 60 VAC | G3VM-61G1 | 100 | --- |
| | | | G3VM-61G1(TR) | --- | 2,500 |

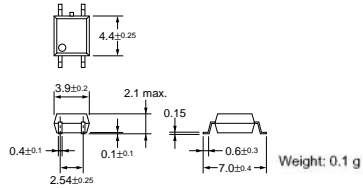
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-61G1

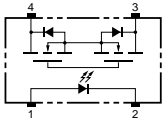


Note: The actual product is marked differently from the image shown here.



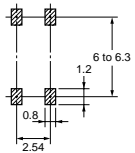
Terminal Arrangement/Internal Connections (Top View)

G3VM-61G1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-61G1



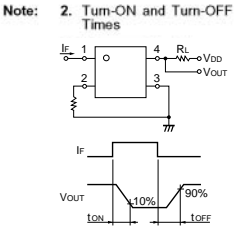
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| | Output dielectric strength | V_{OFF} | 60 | V |
| Output | Continuous load current | I_O | 400 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -4.0 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 1,500 | Vrms |
| Operating temperature | | | | T_A -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 3 | mA | $I_O = 400\text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 1 | 2 | Ω | $I_F = 5\text{ mA}$ $I_O = 400\text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 60\text{ V}$ |
| Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} = 500\text{ VDC}$, $ROH \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.8 | 2.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega$, |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 0.5 | ms | $V_{DO} = 20\text{ V}$ (See note 2.) |



Recommended Operating Conditions

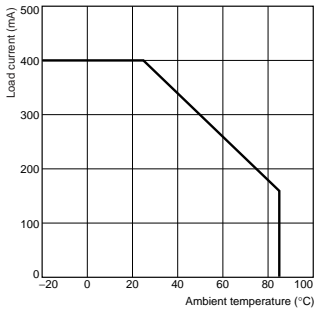
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{OD} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 400 | mA |
| Operating temperature | T_A | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature

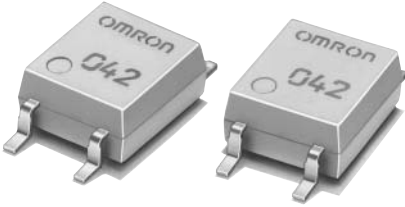
G3VM-61G1



New Relay Incorporating a MOSFET
Optically Coupled with an Infrared LED

Has a 4-pin SOP Package and 80-V Load Voltage

- Continuous load current of 350 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 80 VAC | G3VM-81G1 | 100 | --- |
| | | | G3VM-81G1(TR) | --- | 2,500 |

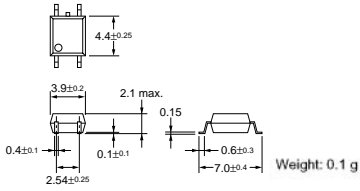
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-81G1

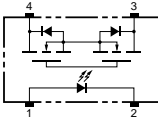


Note: The actual product is marked differently from the image shown here.



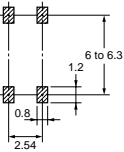
Terminal Arrangement/Internal Connections (Top View)

G3VM-81G1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-81G1



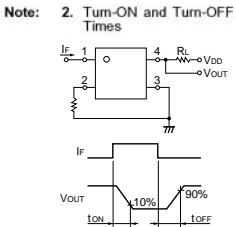
Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Output dielectric strength | V_{OFF} | 80 | V |
| Output | Continuous load current | I_O | 350 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -3.5 | $\text{mA}/^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Dielectric strength between input and output (See note 1.) | V_{I-O} | 1,500 | Vrms AC for 1 min |
| Operating temperature | | T_A | -40 to +85 | $^\circ\text{C}$ With no icing or condensation |
| Storage temperature | | T_{slg} | -55 to +125 | $^\circ\text{C}$ With no icing or condensation |
| Soldering temperature (10 s) | | --- | 260 | $^\circ\text{C}$ 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 15 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1.0 | 4.0 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 1.0 | 1.2 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | 0.2 | 1.0 | nA |
| Capacity between I/O terminals | | C_{I-O} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | M Ω |
| Turn-ON time | | t_{ON} | --- | 0.3 | 0.5 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.3 | 0.5 | ms |



Recommended Operating Conditions

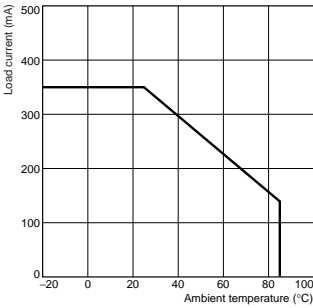
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 64 | V |
| Operating LED forward current | I_F | 5 | --- | 30 | mA |
| Continuous load current | I_O | --- | --- | 350 | mA |
| Operating temperature | T_A | 25 | --- | 60 | $^\circ\text{C}$ |

Engineering Data

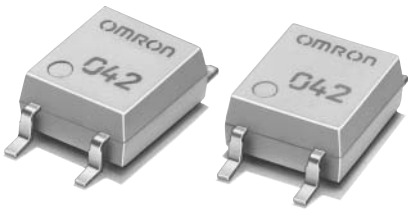
Load Current vs. Ambient Temperature

G3VM-81G1



Slim, 2.1-mm High MOSFET Relay with Miniature, Flat, 4-pin SOP Package Load Voltage

- New models with 4-pin SOP package now available in the 200-V load voltage series.
- Leakage current of 0.01 μA max. when output relay is open.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 200 VAC | G3VM-201G | 100 | --- |
| | | | G3VM-201G(TR) | --- | 2,500 |

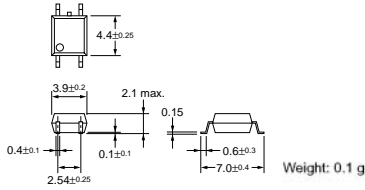
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-201G

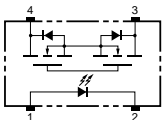


Note: The actual product is marked differently from the image shown here.



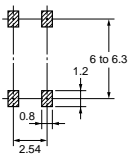
Terminal Arrangement/Internal Connections (Top View)

G3VM-201G



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-201G



Absolute Maximum Ratings (Ta = 25°C)

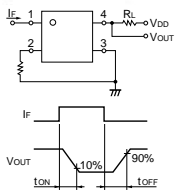
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| Output | Output dielectric strength | V_{OFF} | 200 | V |
| | Continuous load current | I_O | 50 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | $\text{mA}/^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| Dielectric strength between input and output (See note 1.) | | | | $V_{I/O}$ 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 $^\circ\text{C}$ With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +100 $^\circ\text{C}$ With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 $^\circ\text{C}$ 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|-----------|-------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 30 | 50 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 0.01 | μA |
| Capacity between I/O terminals | | | | $C_{I/O}$ | --- | 0.8 |
| Insulation resistance | | | | $R_{I/O}$ | 1,000 | --- |
| Turn-ON time | | | | t_{ON} | --- | 0.04 |
| Turn-OFF time | | | | t_{OFF} | --- | 0.1 |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

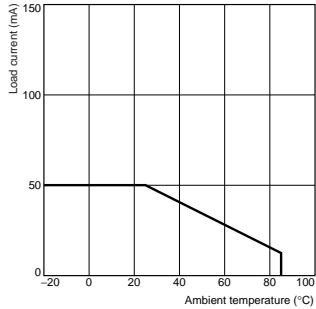
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{OD} | --- | --- | 160 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 15 | mA |
| Continuous load current | I_O | --- | --- | 40 | mA |
| Operating temperature | T_a | 25 | --- | 60 | $^\circ\text{C}$ |

Engineering Data

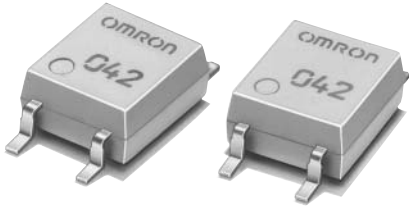
Load Current vs. Ambient Temperature

G3VM-201G



Slim, 2.1-mm High Relay
Incorporating a MOSFET Optically
Coupled with an Infrared LED in a
Miniature, Flat SOP

- Upgraded G3VM-S2 Series.
- Continuous load current of 110 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 350 VAC | G3VM-351G | 100 | --- |
| | | | G3VM-351G(TR) | --- | 2,500 |

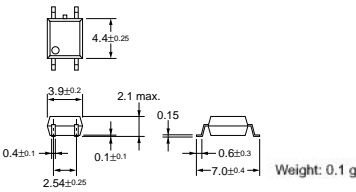
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-351G

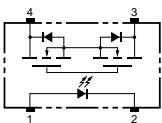


Note: The actual product is marked differently from the image shown here.



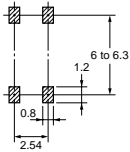
Terminal Arrangement/Internal Connections (Top View)

G3VM-351G



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-351G



Absolute Maximum Ratings (Ta = 25°C)

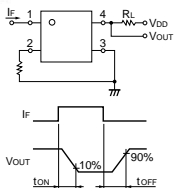
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------------|------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{RP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| | Output dielectric strength | V_{OFF} | 350 | V |
| Output | Continuous load current | I_O | 110 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.1 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| | Dielectric strength between input and output (See note 1.) | V_{LO} | 1,500 | Vrms |
| Operating temperature | | T_a | -40 to +85 | °C |
| Storage temperature | | T_{stg} | -55 to +125 | °C |
| Soldering temperature (10 s) | | — | 280 | °C |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 25 | 35 | Ω |
| | | | --- | 35 | 50 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| Capacity between I/O terminals | | C_{LO} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{LO} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

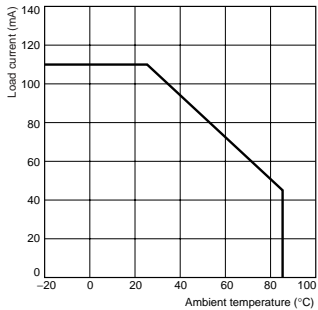
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{OD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

Engineering Data

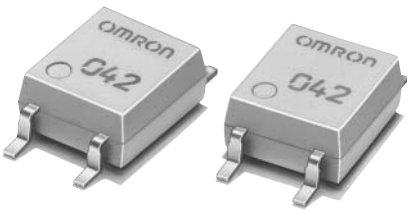
Load Current vs. Ambient Temperature

G3VM-351G



Analog-switching MOSFET Relay with SPST-NC (Single-pole, Single-throw, Normally Closed) Contacts

- New models with SPST-NC contacts and a 4-pin SOP package included in 350-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NC | Surface-mounting terminals | 350 VAC | G3VM-353G | 100 | --- |
| | | | G3VM-353G(TR) | --- | 2,500 |

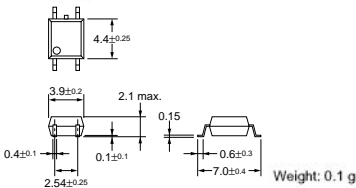
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-353G

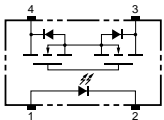


Note: The actual product is marked differently from the image shown here.



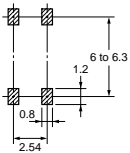
Terminal Arrangement/Internal Connections (Top View)

G3VM-353G



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-353G



Absolute Maximum Ratings (Ta = 25°C)

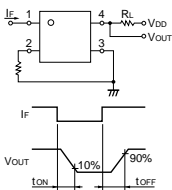
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | $\text{mA}/^\circ\text{C}$ |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 $^\circ\text{C}$ With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 $^\circ\text{C}$ With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 $^\circ\text{C}$ 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 15 | 25 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| | Capacity between I/O terminals | C_{I-O} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | M Ω |
| Turn-ON time | | t_{ON} | --- | 1.0 | --- | ms |
| Turn-OFF time | | t_{OFF} | --- | 3.0 | --- | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

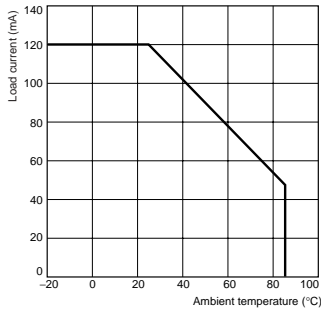
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_a | -20 | --- | 65 | $^\circ\text{C}$ |

Engineering Data

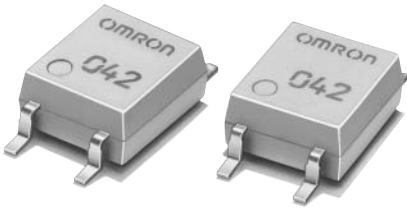
Load Current vs. Ambient Temperature

G3VM-353G



Expanded Range of Analog-Switching MOSFET Relays in 400-V Load Voltage Series

- New models with a 4-pin SOP package now included in the 400-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 400 VAC | G3VM-401G | 100 | --- |
| | | | G3VM-401G(TR) | --- | 2,500 |

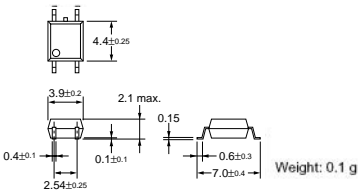
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-401G

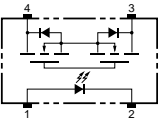


Note: The actual product is marked differently from the image shown here.



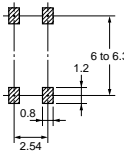
Terminal Arrangement/Internal Connections (Top View)

G3VM-401G



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-401G



Absolute Maximum Ratings (Ta = 25°C)

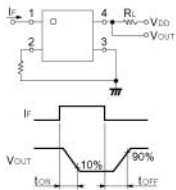
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 400 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| Dielectric strength between input and output (See note 1.) | | | | V_{LO} 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_A -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|----------------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 17 | 35 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| | Capacity between I/O terminals | C_{LO} | --- | 0.8 | --- | pF |
| Insulation resistance | | | | R_{LO} 1,000 | --- | MΩ |
| Turn-ON time | | | | t_{ON} 0.3 | 1 | ms |
| Turn-OFF time | | | | t_{OFF} 0.1 | 1 | ms |

Note: 2. Turn-ON and Turn-OFF Times



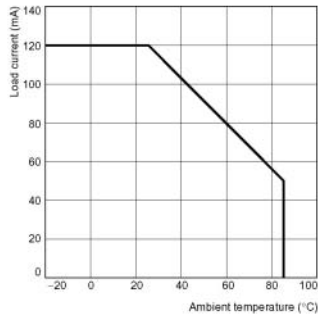
Recommended Operating Conditions

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

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DO} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_A | -20 | --- | 65 | °C |

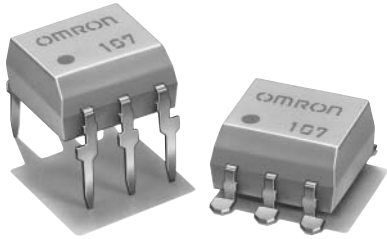
Engineering Data

Load Current vs. Ambient Temperature
G3VM-401G



Analog-Switching MOSFET Relay
for High Switching Currents, with
Dielectric Strength of 2.5 kVAC
between I/O.

- Upgraded G3VM-61 B/E Series.
- Switches minute analog signals.
- Leakage current of 1μA max. when output relay is open.



NEW Approval pending

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

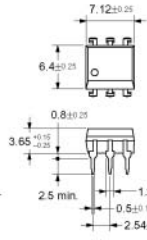
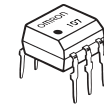
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 60 VAC | G3VM-61B1 | 50 | --- |
| | Surface-mounting terminals | | G3VM-61E1 | --- | --- |
| | | | G3VM-61E1(TR) | --- | 1,500 |

Dimensions

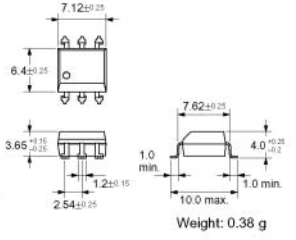
Note: All units are in millimeters unless otherwise indicated.

G3VM-61B1



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

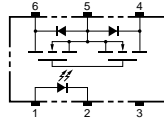
G3VM-61E1



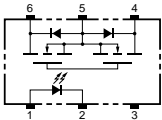
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-61B1

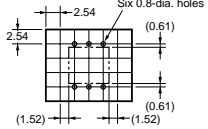


G3VM-61E1



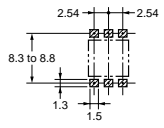
PCB Dimensions (Bottom View)

G3VM-61B1



Actual Mounting Pad Dimensions
(Recommended Value, Top View)

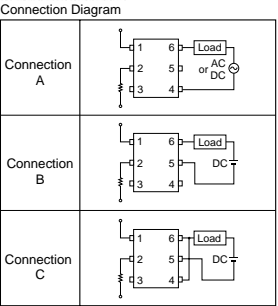
G3VM-61E1



Absolute Maximum Ratings (Ta = 25°C)

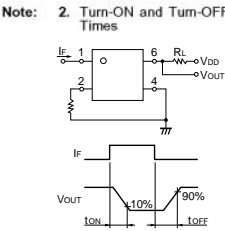
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|-----------------------------|-------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_i | 125 | $^\circ\text{C}$ |
| Output | Output dielectric strength | V_{OFF} | 60 | V |
| | Continuous load current | Connection A | 500 | mA |
| | | Connection B | 500 | |
| | | Connection C | 1,000 | |
| | ON current reduction rate | Connection A | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | | Connection B | -0.5 | |
| | | Connection C | -10.0 | |
| | Connection temperature | T_i | 125 | $^\circ\text{C}$ |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 2,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 $^\circ\text{C}$ With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 $^\circ\text{C}$ With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 $^\circ\text{C}$ 10 s |

Note: 1. 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.



Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions | |
|-----------------------|--|--------------|-----------|---------|---------|---------------|---|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ | |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ | |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ | |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 3 | mA | $I_O = 500\text{ mA}$ | |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 1 | 2 | Ω | $I_F = 5\text{ mA},$ $I_O = 500\text{ mA}$ |
| | | Connection B | --- | 0.5 | 1 | Ω | $I_F = 5\text{ mA},$ $I_O = 500\text{ mA}$ | |
| | | Connection C | --- | 0.25 | --- | Ω | $I_F = 5\text{ mA},$ $I_O = 1,000\text{ mA}$ | |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 60\text{ V}$ | |
| | Capacity between I/O terminals | | C_{I-O} | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | M Ω | $V_{I-O} = 500\text{ VDC},$ $\text{RoH} \leq 60\%$ | |
| Turn-ON time | | t_{ON} | --- | 0.8 | 2.0 | ms | $I_F = 5\text{ mA}, R_L = 200\ \Omega,$ | |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 0.5 | ms | $V_{DD} = 20\text{ V}$ (See note 2.) | |



Recommended Operating Conditions

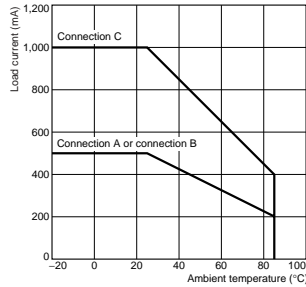
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 500 | mA |
| Operating temperature | T_a | -20 | --- | 85 | $^\circ\text{C}$ |

Engineering Data

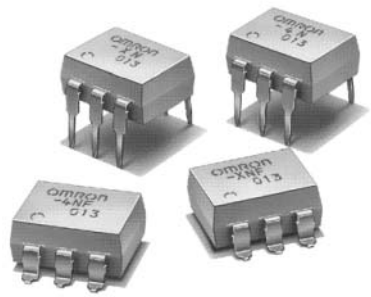
Load Current vs. Ambient Temperature

G3VM-61B1(E1)



SSR for Switching Analog Signals, with an I/O Dielectric Strength of 2.5 kVAC Using Optical Isolation

- Switches minute analog signals.
- Linear voltage and current characteristics.
- Switches AC and DC.
- Low ON-resistance.
- Current leakage less than 1 μA between output terminals when they are open.
- Surface-mounting models also available.
- UL/CSA approval pending.



Ordering Information

| Contact form | Terminals | Load Voltage (peak value) | Model | Number per stick | Taping quantity |
|--------------|----------------------------|---------------------------|----------|------------------|-----------------|
| SPST-NO | PCB terminals | 60 VAC | G3VM-XN | 50 | --- |
| | | 400 VAC | G3VM-4N | | |
| | Surface-mounting terminals | 60 VAC | G3VM-XNF | | |
| | | 400 VAC | G3VM-4NF | | |

Model Number Legend

G3VM-□□□
1 2

1. Lead Voltage

XN: A load voltage of 60 VDC or 60 VAC (peak value)

4N: A load voltage of 400 VDC or 400 VAC (peak value)
2. Terminal

None: PCB terminal

F: Surface mounting terminals

Application Examples

- Electronic automatic exchange systems
- Measurement control systems
- Data gathering systems
- Measuring systems

Specifications

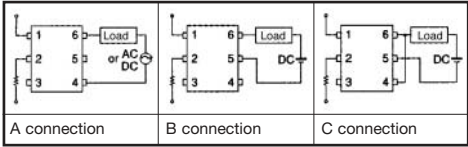
Absolute Maximum Ratings (Ta = 25°C)

| Item | | | Symbol | G3VM-XN(F) | G3VM-4N(F) | Conditions |
|-------------------------------------|--|--------------|------------------|------------------|---------------|-------------------------------|
| Input | LED forward current | | I _F | 30 mA | | – |
| | Repetitive peak LED forward current | | I _{FP} | 1 A | | 100-μs pulses, 100 pps |
| | LED reverse voltage | | V _R | 5 V | | – |
| Output | Output dielectric strength (load voltage) | | V _{BO} | –60 to 60 V | –400 to 400 V | DC or AC peak value |
| | | | | 0 to 60 V | 0 to 400 V | DC |
| | Continuous load current (see note 1) | A connection | I _O | 300 mA | 150 MA | – |
| | | B connection | | 450 mA | 200 MA | |
| | | C connection | | 600 mA | 300 MA | |
| | Dielectric strength between I/O terminals (see note 2) | | | V _{I-O} | 2,500 V AC | |
| Ambient temperature | | | T _a | –20 to 85°C | | With no icing or condensation |
| Storage temperature | | | T _{stg} | –55 to 100°C | | With no icing or condensation |
| Max. soldering temperature and time | | | – | 260°C | | 10 s |

Note: 1. The load current attenuation rates for the different types of connection are as follows:
G3VM-XN(F): A: -3.0 mA/°C; B: -4.5 mA/°C; C: -6.0 mA/°C
G3VM-4N(F): A: -1.5 mA/°C; B: -2.0 mA/°C; C: -3.0 mA/°C

2. The dielectric strength between I/O terminals was measured with voltage applied to all of the LED pins and with voltage applied to all of the light-receiving parts respectively.

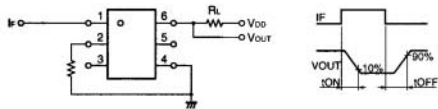
Connection Circuit Diagram



Electrical Performance (Ta = 25°C)

| Item | | Symbol | G3VM-XN(F) | G3VM-4N(F) | Unit | Conditions |
|---|-----------------------------|--------------|-----------------------|-------------|-----------|---|
| Input | LED forward current | V_F | 1.2 V min, 1.7 V max. | | V | $I_F = 10 \text{ mA}$ |
| | Trigger LED forward current | I_{FT} | 5 mA max. | | | $I_O = 300 \text{ mA}$ (G3VM-XN(F)) $I_O = 150 \text{ mA}$ (G3VM-4N(F)) |
| Output | Output ON resistance | A Connection | R_{ON} | 2 Ω max. | 12 Ω max. | $I_F = 10 \text{ mA}$ |
| | | B Connection | | 1 Ω max. | 6 Ω max. | $I_O = \text{Max.}$ |
| | | C Connection | | 0.5 Ω max. | 3 Ω max. | |
| | Switching current leakage | I_{LEAK} | 1.0 μA max. | | μA | $V_{off} = 60 \text{ V}$ (G3VM-XN(F)) $V_{off} = 400 \text{ V}$ (G3VM-4N(F)) |
| Operate time | | T_{ON} | 0.5 ms max. | 1.0 ms max. | ms | $R_L = 200 \text{ Ω}$ (see note) |
| Release time | | T_{OFF} | 0.5 ms max. | 1.0 ms max. | ms | $V_{DD} = 20 \text{ V}$, $I_F = 10 \text{ mA}$ |
| Floating capacity between I/O terminals | | C_{I-O} | 0.8 pF, TYP | | pF | $f = 1 \text{ MHz}$ |

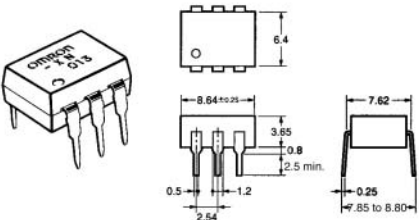
Note: 1. The operate and release time were measured in the way shown below.



Dimensions

Note: All units are in millimeters unless otherwise indicated.

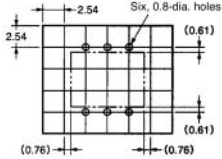
G3VM-XN
G3VM-4N



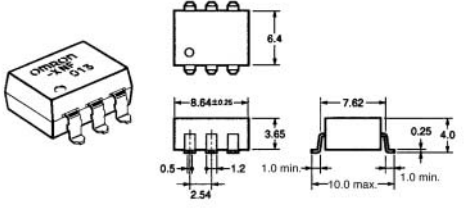
Note: "G3VM" is not printed on the actual product.

PCB Dimensions (Bottom View)

G3VM-XN
G3VM-4N

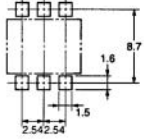


G3VM-XNF
G3VM-4NF



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-XNF
G3VM-4NF

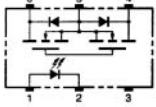


Note: Mounting pad dimensions shown are top view.

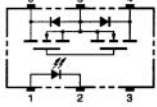
Installation

Terminal Arrangement/Internal connection (Top View)

G3VM-XN
G3VM-4N



G3VM-XNF
G3VM-4NF



New Series with 350-V Load Voltage

- Upgraded G3VM-3 Series.
- Continuous load current of 120 mA
- Dielectric strength of 2,500 Vrms between I/O.
- Operating time of 0.3 ms (typical).



Application Examples

- Measurement devices
- Security systems
- Amusement machines

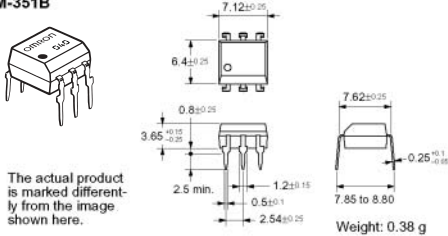
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 350 VAC | G3VM-351B | 50 | --- |
| | Surface-mounting terminals | | G3VM-351E | --- | --- |
| | | | G3VM-351E(TR) | --- | 1,500 |

Dimensions

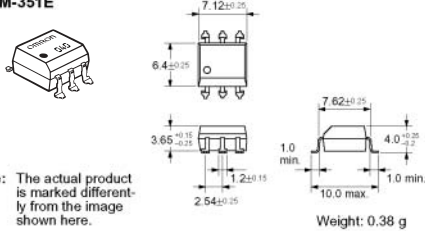
Note: All units are in millimeters unless otherwise indicated.

G3VM-351B



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

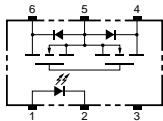
G3VM-351E



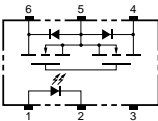
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-351B

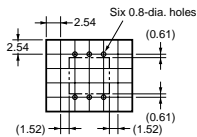


G3VM-351E



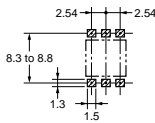
PCB Dimensions (Bottom View)

G3VM-351B



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-351E

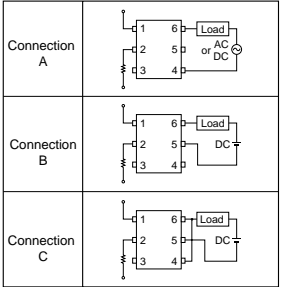


Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|-----------------------------|-------------|------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_i | 125 | °C |
| Output | Output dielectric strength | V_{DO} | 350 | V |
| | Continuous load current | Connection A | 120 | mA |
| | | Connection B | 120 | mA |
| | | Connection C | 240 | mA |
| | ON current reduction rate | Connection A | -1.2 | mA/°C |
| | | Connection B | -1.2 | mA/°C |
| | | Connection C | -2.4 | mA/°C |
| | Connection temperature | T_i | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | V_{IO} | 2,500 | Vrms |
| Operating temperature | | T_a | -40 to +85 | °C |
| Storage temperature | | T_{stg} | -55 to +125 | °C |
| Soldering temperature (10 s) | | --- | 260 | °C |

Note: 1. 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.

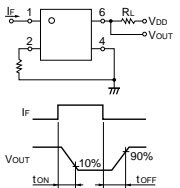
Connection Diagram



Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions | |
|-----------------------|-----------------------------------|--------------|--|------------|----------|--|---|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10 \text{ mA}$ | |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5 \text{ V}$ | |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1 \text{ MHz}$ | |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 120 \text{ mA}$ | |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 25 | 35 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}, t < 1 \text{ s}$ |
| | | | --- | 35 | 50 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}$ | |
| | | | --- | 28 | 40 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}$ | |
| | Connection B | --- | 28 | 40 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}$ | | |
| | | Connection C | --- | 14 | 20 | Ω | $I_F = 5 \text{ mA}$ $I_O = 240 \text{ mA}$ | |
| | | | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| | Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF | $f = 1 \text{ MHz}, V_S = 0 \text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} = 500 \text{ VDC}$, $RoH \leq 60\%$ | |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms | $I_F = 5 \text{ mA}, R_L = 200 \Omega$, $V_{DD} = 20 \text{ V}$ (See note 2). | |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms | | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

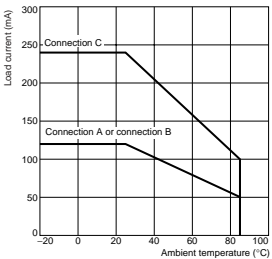
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DO} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 10 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-351B(E)



Analog-switching MOSFET Relay with 350-V Load Voltage and Current Limit.

■ Approved standards: UL1577 (File No. E80555)

■ Application Examples

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



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

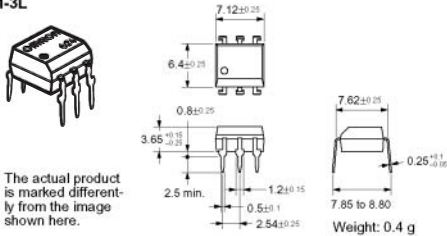
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Current limit | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|--------------|---------------|------------------|-----------------|
| SPST-NO | PCB terminals | 350 VAC | G3VM-3L | Yes | 50 | --- |
| | Surface-mounting terminals | | G3VM-3FL | | | |
| | Surface-mounting terminals | | G3VM-3FL(TR) | | | 1,500 |

■ Dimensions

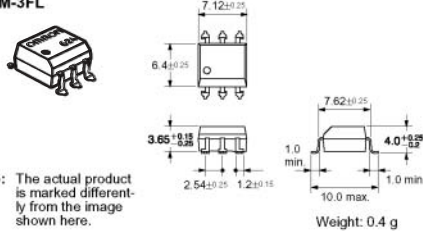
Note: All units are in millimeters unless otherwise indicated.

G3VM-3L



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

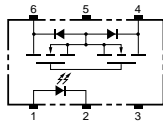
G3VM-3FL



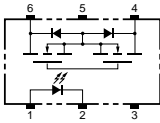
Note: The actual product is marked differently from the image shown here.

■ Terminal Arrangement/Internal Connections (Top View)

G3VM-3L

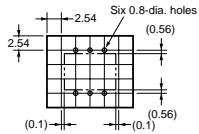


G3VM-3FL



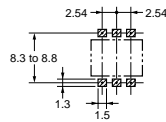
■ PCB Dimensions (Bottom View)

G3VM-3L



■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-3FL



■ Absolute Maximum Ratings (Ta = 25°C)

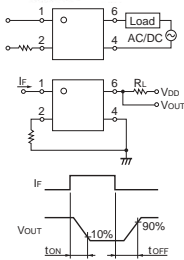
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 2,500 Vrms AC for 1 min |
| Operating temperature | | | | T_A -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

■ Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | --- | 3 | mA |
| | Maximum resistance with output ON | R_{ON} | --- | 22 | 35 | Ω |
| Output | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| | Limit current | I_{LM} | 150 | --- | 300 | mA |
| Capacity between I/O terminals | | C_{I-O} | --- | 0.6 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | --- | 1.0 | ms |

Note: 2. Turn-ON and Turn-OFF Times



■ Recommended Operating Conditions

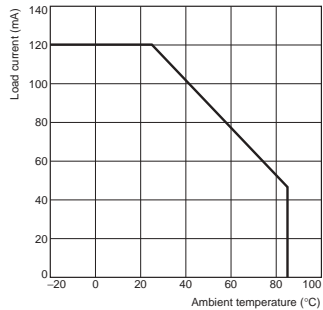
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_A | -20 | --- | 85 | °C |

■ Engineering Data

Load Current vs. Ambient Temperature

G3VM-3(F)L

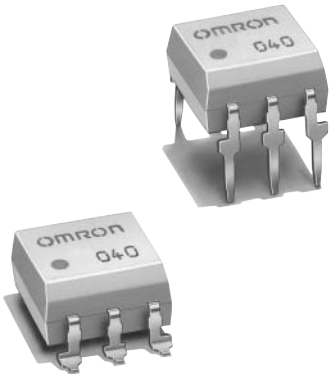


Analog-switching MOSFET Relay with SPST-NC (Single-pole, Single-throw, Normally Closed) Contacts

- Switches minute analog signals.
- Switching AC and DC.

Application Examples

- Electronic automatic exchange systems
- Security systems
- Datacom (modem) systems
- FA systems
- Measurement devices



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

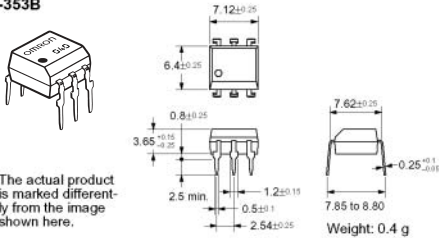
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NC | PCB terminals | 350 VAC | G3VM-353B | 50 | --- |
| | Surface-mounting terminals | | G3VM-353E | --- | --- |
| | | | G3VM-353E(TR) | --- | 1,500 |

Dimensions

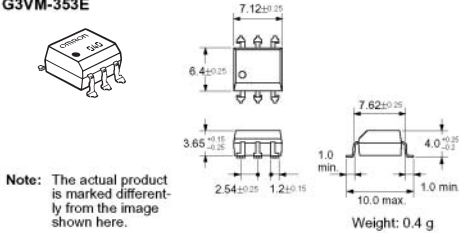
Note: All units are in millimeters unless otherwise indicated.

G3VM-353B



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

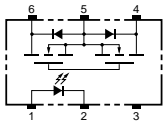
G3VM-353E



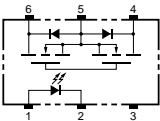
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-353B

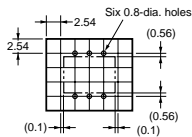


G3VM-353E



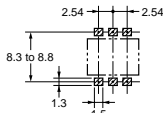
PCB Dimensions (Bottom View)

G3VM-353B



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-353E

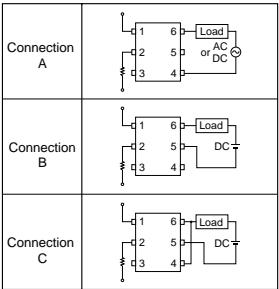


Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|---------------------------|------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/\text{°C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_i | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 150 | mA |
| | Connection A | | 150 | |
| | Connection B | | 150 | |
| | Connection C | | 300 | |
| ON current reduction rate | Connection A | $\Delta I_{ON}/\text{°C}$ | -1.5 | mA/°C |
| | Connection B | | -1.5 | |
| | Connection C | | -3.0 | |
| | Connection temperature | T_i | 125 | °C |
| Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms | AC for 1 min |
| Operating temperature | T_a | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | T_{stg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | --- | 280 | °C | 10 s |

Note: 1. 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.

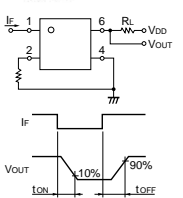
Connection Diagram



Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--|-----------------------------------|----------|---------|---------|------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 15 | 25 | Ω |
| | Connection A | | | 8 | 14 | Ω |
| | Connection B | | | 4 | 7 | Ω |
| | Connection C | | | --- | --- | --- |
| Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $I_F = 5 \text{ mA}$, $V_{OFF} = 350 \text{ V}$ |
| | | | | | | |
| Capacity between I/O terminals | C_{IO} | --- | 0.8 | --- | pF | $f = 1 \text{ MHz}$, $V_S = 0 \text{ V}$ |
| Insulation resistance | R_{IO} | 1,000 | --- | --- | MΩ | $V_{IO} = 500 \text{ VDC}$, $RoH \leq 60\%$ |
| Turn-ON time | t_{ON} | --- | 0.1 | 1.0 | ms | $I_F = 5 \text{ mA}$, $R_L = 200 \text{ Ω}$, $V_{DD} = 20 \text{ V}$ (See note 2.) |
| Turn-OFF time | t_{OFF} | --- | 1.0 | 3.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

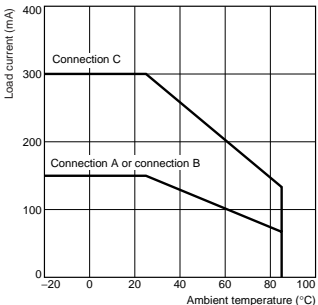
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 150 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

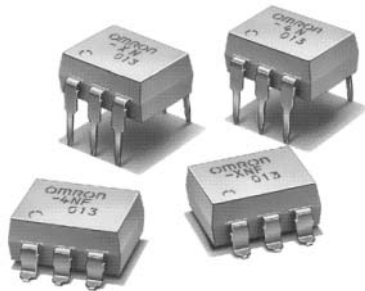
Load Current vs. Ambient Temperature

G3VM-353B(E)



SSR for Switching Analog Signals, with an I/O Dielectric Strength of 2.5 kVAC Using Optical Isolation

- Switches minute analog signals.
- Linear voltage and current characteristics.
- Switches AC and DC.
- Low ON-resistance.
- Current leakage less than 1 μA between output terminals when they are open.
- Surface-mounting models also available.
- UL/CSA approval pending.



Ordering Information

| Contact form | Terminals | Load Voltage (peak value) | Model | Number per stick | Taping quantity |
|--------------|----------------------------|---------------------------|----------|------------------|-----------------|
| SPST-NO | PCB terminals | 60 VAC | G3VM-XN | 50 | — |
| | | 400 VAC | G3VM-4N | | |
| | Surface-mounting terminals | 60 VAC | G3VM-XNF | | |
| | | 400 VAC | G3VM-4NF | | |

Model Number Legend

G3VM-□□□
1 2

1. Load Voltage

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

2. Terminal

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

Application Examples

- Electronic automatic exchange systems
 - Measurement control systems
- Data gathering systems
 - Measuring systems

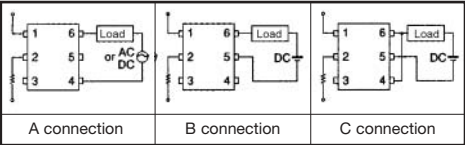
Specifications

■ Absolute Maximum Ratings (Ta = 25°C)

| Item | | | Symbol | G3VM-XN(F) | G3VM-4N(F) | Conditions |
|--|---|--------------|------------------|--------------|---------------|-------------------------------|
| Input | LED forward current | | I _F | 30 mA | | — |
| | Repetitive peak LED forward current | | I _{FP} | 1 A | | 100-μs pulses, 100 pps |
| | LED reverse voltage | | V _R | 5 V | | — |
| Output | Output dielectric strength (load voltage) | | V _{BO} | -60 to 60 V | -400 to 400 V | DC or AC peak value |
| | | | | 0 to 60 V | 0 to 400 V | DC |
| | Continuous load current (see note 1) | A connection | I _O | 300 mA | 150 MA | — |
| | | B connection | | 450 mA | 200 MA | |
| | | C connection | | 600 mA | 300 MA | |
| Dielectric strength between I/O terminals (see note 2) | | | V _{I-O} | 2,500 V AC | | 1 min |
| Ambient temperature | | | T _a | -20 to 85°C | | With no icing or condensation |
| Storage temperature | | | T _{stg} | -55 to 100°C | | With no icing or condensation |
| Max. soldering temperature and time | | | — | 260°C | | 10 s |

Note: 1. The load current attenuation rates for the different types of connection are as follows:
G3VM-XN(F): A: -3.0 mA/°C; B: -4.5 mA/°C; C: -6.0 mA/°C
G3VM-4N(F): A: -1.5 mA/°C; B: -2.0 mA/°C; C: -3.0 mA/°C
2. The dielectric strength between I/O terminals was measured with voltage applied to all of the LED pins and with voltage applied to all of the light-receiving parts respectively.

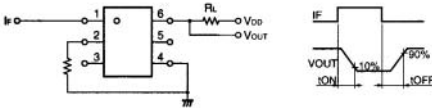
Connection Circuit Diagram



■ Electrical Performance (Ta = 25°C)

| Item | | Symbol | G3VM-XN(F) | G3VM-4N(F) | Unit | Conditions |
|---|-----------------------------|-------------------|-----------------------|-------------|-----------|---|
| Input | LED forward current | V _F | 1.2 V min, 1.7 V max. | | V | I _F = 10 mA |
| | Trigger LED forward current | I _{FT} | 5 mA max. | | | I _O = 300 mA (G3VM-XN(F)) I _O = 150 mA (G3VM-4N(F)) |
| Output | Output ON resistance | R _{ON} | A Connection | 2 Ω max. | 12 Ω max. | I _F = 10 mA I _O = Max. |
| | | | B Connection | 1 Ω max. | 6 Ω max. | |
| | | | C Connection | 0.5 Ω max. | 3 Ω max. | |
| | Switching current leakage | I _{LEAK} | 1.0 μA max. | | μA | V _{off} = 60 V (G3VM-XN(F)) V _{off} = 400 V (G3VM-4N(F)) |
| Operate time | | T _{ON} | 0.5 ms max. | 1.0 ms max. | ms | R _L = 200 Ω (sse note) |
| Release time | | T _{OFF} | 0.5 ms max. | 1.0 ms max. | ms | V _{DD} = 20 V, I _F = 10 mA |
| Floating capacity between I/O terminals | | C _{I-O} | 0.8 pF, TYP | | pF | f = 1 MHz |

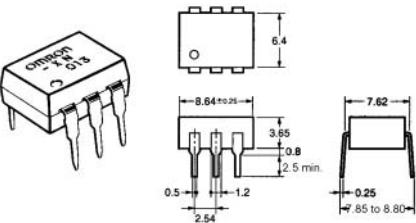
Note: 1. The operate and release time were measured in the way shown below.



Dimensions

Note: All units are in millimeters unless otherwise indicated.

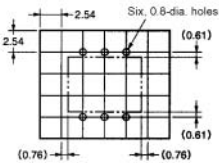
G3VM-XN
G3VM-4N



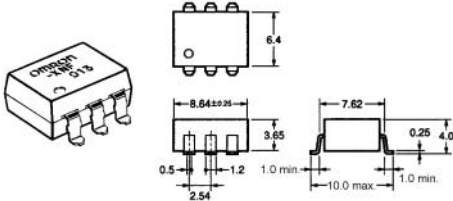
Note: “G3VM” is not printed on the actual product.

PCB Dimensions (Bottom View)

G3VM-XN
G3VM-4N

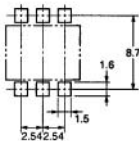


G3VM-XNF
G3VM-4NF



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-XNF
G3VM-4NF

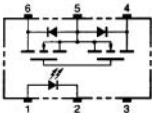


Note: Mounting pad dimensions shown are top view.

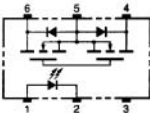
Installation

Terminal Arrangement/Internal connection (Top View)

G3VM-XN
G3VM-4N

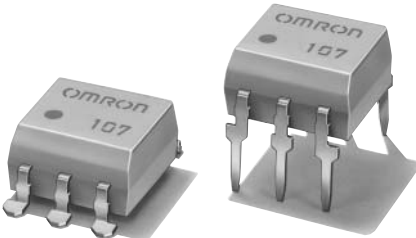


G3VM-XNF
G3VM-4NF



Analog-switching MOSFET Relay with Dielectric Strength of 5 kVAC between I/O Using Optical Isolation

- Switches minute analog signals.
- Leakage current of 1 μ A max. when output relay is open.



Application Examples

- Electronic automatic exchange systems
- Measurement devices
- FA systems

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

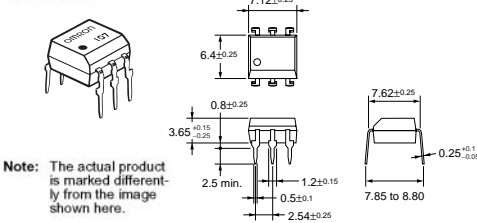
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|-----------------|------------------|-----------------|
| SPST-NO | PCB terminals | 400 VAC | G3VM-401BY | 50 | --- |
| | Surface-mounting terminals | | G3VM-401EY | | |
| | | | G3VM-401EY (TR) | --- | 1,500 |

Dimensions

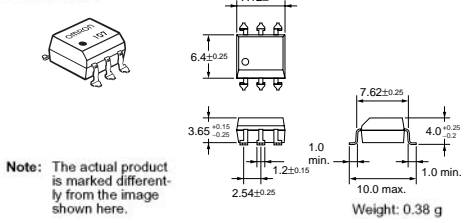
Note: All units are in millimeters unless otherwise indicated.

G3VM-401BY



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

G3VM-401EY

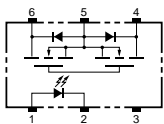


Note: The actual product is marked differently from the image shown here.

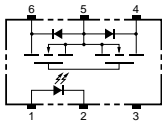
Weight: 0.38 g

Terminal Arrangement/Internal Connections (Top View)

G3VM-401BY

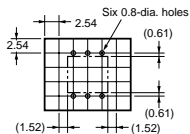


G3VM-401EY



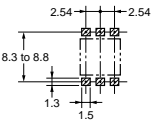
PCB Dimensions (Bottom View)

G3VM-401BY



Actual Mounting Pad Dimensions (Recommended Value, Top View)

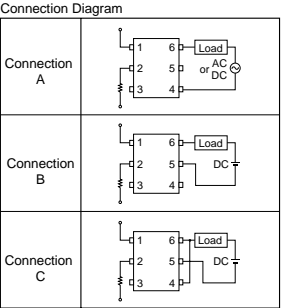
G3VM-401EY



Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|-----------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_j | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 400 | V |
| | Continuous load current | Connection A | 120 | mA |
| | | Connection B | 120 | |
| | | Connection C | 240 | |
| | ON current reduction rate | Connection A | -1.2 | mA/°C |
| | | Connection B | -1.2 | |
| | | Connection C | -2.4 | |
| | Connection temperature | T_j | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | $V_{I/O}$ 5,000 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{slg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

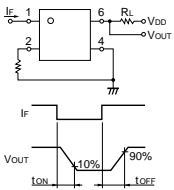
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--|-----------------------------------|------------|---------|---------|------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 3 | mA | $I_O = 120\text{ mA}$ |
| | Maximum resistance with output ON | R_{ON} | 17 | 35 | Ω | $I_F = 5\text{ mA}$ $I_O = 120\text{ mA}$ |
| Output | Connection A | | --- | 11 | 20 | Ω |
| | Connection B | | --- | 6 | 10 | Ω |
| | Connection C | | --- | 6 | 10 | Ω |
| Current leakage when the relay is open | | I_{LEAK} | --- | 1.0 | μA | $V_{OFF} = 400\text{ V}$ |
| Capacity between I/O terminals | | $C_{I/O}$ | 0.8 | --- | pF | $f = 1\text{ MHz}, V_s = 0\text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | MΩ | $V_{I/O} = 500\text{ VDC}$ $RoH \leq 80\%$ |
| Turn-ON time | | t_{ON} | 0.3 | 1.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ Ω}$ $V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | | t_{OFF} | 0.1 | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

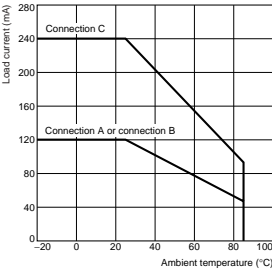
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

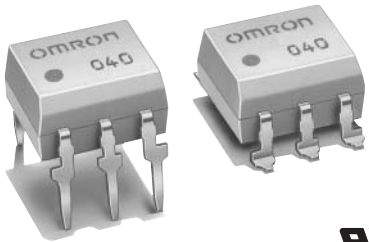
Load Current vs. Ambient Temperature

G3VM-401BY(EY)



Analog-switching MOSFET Relay with a Dielectric Strength of 5 kVAC between I/O Using Optical Isolation

- Switches minute analog signals.
- Switching AC and DC.
- Peak load voltage of 600 V.
- Dielectric strength of 5 kVAC between I/O.



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

Application Examples

- Electronic automatic exchange systems
- FA systems
- Measurement devices
- Security systems

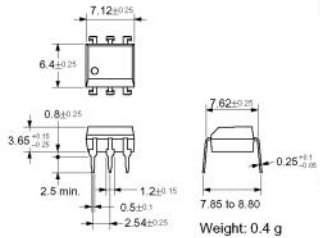
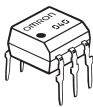
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|----------------|------------------|-----------------|
| SPST-NO | PCB terminals | 600 VAC | G3VM-601BY | 50 | --- |
| | Surface-mounting terminals | | G3VM-601EY | --- | 1,500 |
| | Surface-mounting terminals | | G3VM-601EY(TR) | --- | 1,500 |

Dimensions

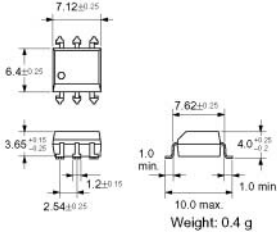
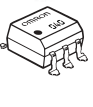
Note: All units are in millimeters unless otherwise indicated.

G3VM-601BY



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

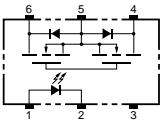
G3VM-601EY



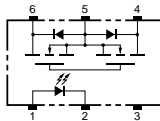
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-601BY

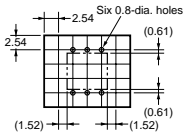


G3VM-601EY



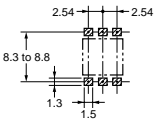
PCB Dimensions (Bottom View)

G3VM-601BY



Actual Mounting Pad Dimensions (Recommended Value, Top View)

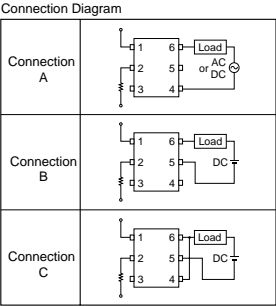
G3VM-601EY



Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Rating | Unit | Measurement Conditions | |
|--|-------------------------------------|-----------------------------|--------------------------------|----------------------|-------------------------------|-----------------------------|
| Input | LED forward current | I_F | 50 | mA | | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps | |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/ $^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ | |
| | LED reverse voltage | V_R | 5 | V | | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | | |
| Output | Output dielectric strength | | V_{OFF} | 600 | V | |
| | Continuous load current | Connection A | I_O | 100 | mA | |
| | | Connection B | | 100 | | |
| | | Connection C | | 200 | | |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -1.0 | mA/ $^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | | Connection B | | -1.0 | | |
| | | Connection C | | -2.0 | | |
| | Connection temperature | | T_J | 125 | $^\circ\text{C}$ | |
| Dielectric strength between input and output (See note 1.) | | V_{IO} | 5,000 | Vrms | AC for 1 min | |
| Operating temperature | | T_a | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation | |
| Storage temperature | | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation | |
| Soldering temperature (10 s) | | — | 260 | $^\circ\text{C}$ | 10 s | |

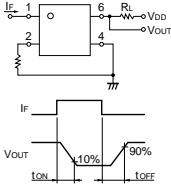
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|--------------|----------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 5 | mA | $I_O = 100\text{ mA}$ |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | 25 | 35 | Ω | $I_F = 10\text{ mA}, I_O = 100\text{ mA}$ |
| | | --- | --- | 30 | 45 | Ω | $I_F = 10\text{ mA}, I_O = 100\text{ mA}$ |
| | | Connection B | --- | 23 | 35 | Ω | $I_F = 10\text{ mA}, I_O = 100\text{ mA}$ |
| | Current leakage when the relay is open | Connection C | --- | 12 | 18 | Ω | $I_F = 10\text{ mA}, I_O = 200\text{ mA}$ |
| | | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 600\text{ V}$ |
| | Capacity between I/O terminals | C_{IO} | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_s = 0\text{ V}$ |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | M Ω | $V_{IO} = 500\text{ VDC}, \text{RoH} \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.2 | 1.5 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega, V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | 0.2 | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

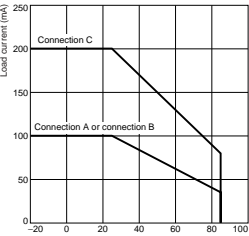
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 480 | V |
| Operating LED forward current | I_F | 7.5 | 15 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 65 | $^\circ\text{C}$ |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-601BY(EY)



Switches Minute Signals and Analog Signals, 6-pin SOP Package and 60-V Load Voltage

- Continuous load current of 400 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 60 VAC | G3VM-61H1 | 75 | --- |
| | | | G3VM-61H1(TR) | --- | 2,500 |

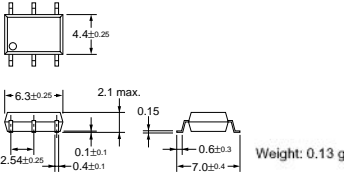
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-61H1

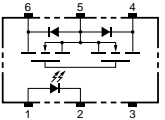


Note: The actual product is marked differently from the image shown here.



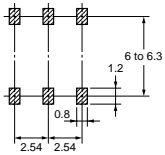
Terminal Arrangement/Internal Connections (Top View)

G3VM-61H1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

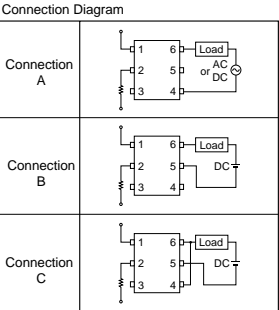
G3VM-61H1



Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|-----------------------------|--------------------------------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 60 | V |
| | Continuous load current | Connection A | I_O | 400 |
| | | Connection B | | 400 |
| | | Connection C | | 800 |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -4.0 |
| | | Connection B | | -4.0 |
| | | Connection C | | -8.0 |
| | Connection temperature | T_J | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_R -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | — 280 °C 10 s |

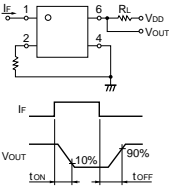
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions | |
|--------------------------------|--|--------------|----------|---------|---------|---------------|--|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ | |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ | |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ | |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 3 | mA | $I_O = 400\text{ mA}$ | |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 1 | 2 | Ω | $I_F = 5\text{ mA}$ $I_O = 400\text{ mA}$ |
| | | Connection B | --- | 0.5 | 1 | Ω | $I_F = 5\text{ mA}$ $I_O = 400\text{ mA}$ | |
| | | Connection C | --- | 0.25 | --- | Ω | $I_F = 5\text{ mA}$ $I_O = 800\text{ mA}$ | |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 60\text{ V}$ | |
| Capacity between I/O terminals | | C_{I-O} | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ | |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | M Ω | $V_{I-O} = 500\text{ VDC}$, $RoH \geq 60\%$ | |
| Turn-ON time | | t_{ON} | --- | 0.8 | 2.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega$, $V_{DD} = 20\text{ V}$ (See note 2.) | |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 0.5 | ms | | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

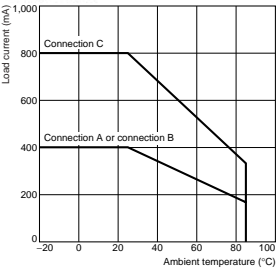
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 400 | mA |
| Operating temperature | T_R | -20 | --- | 65 | °C |

Engineering Data

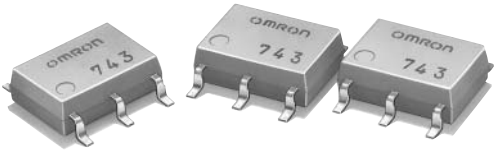
Load Current vs. Ambient Temperature

G3VM-61H1



Slim, 2.1-mm High, MOSFET Relay with Miniature, Flat, 6-pin SOP Package

- New models with 6-pin SOP package now available in the 200-V load voltage series.
- Continuous load current of 200 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

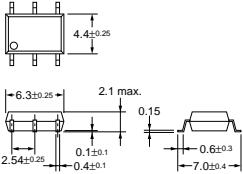
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|----------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 200 VAC | G3VM-201H1 | 75 | --- |
| | | | G3VM-201H1(TR) | --- | 2,500 |

Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-201H1

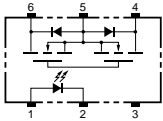


Note: The actual product is marked differently from the image shown here.

Weight: 0.13 g

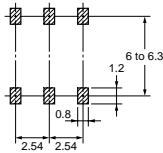
Terminal Arrangement/Internal Connections (Top View)

G3VM-201H1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

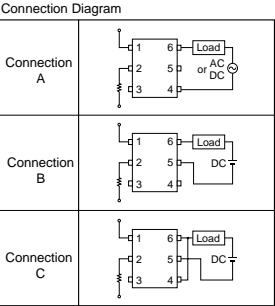
G3VM-201H1



■ Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Rating | Unit | Measurement Conditions | |
|--|-------------------------------------|-----------------------------|--------------------------------|-------|-------------------------------|----------------|
| Input | LED forward current | I_F | 50 | mA | | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps | |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C | Ta \geq 25°C | |
| | LED reverse voltage | V_R | 5 | V | | |
| | Connection temperature | T_J | 125 | °C | | |
| Output | Output dielectric strength | V_{OFF} | 200 | V | | |
| | Continuous load current | Connection A | I_O | 200 | mA | |
| | | Connection B | | 200 | | |
| | | Connection C | | 400 | | |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -2.0 | mA/°C | Ta \geq 25°C |
| | | Connection B | | -2.0 | | |
| | | Connection C | | -4.0 | | |
| | Connection temperature | T_J | 125 | °C | | |
| Dielectric strength between input and output (See note 1.) | | V_{I-O} | 1,500 | Vrms | AC for 1 min | |
| Operating temperature | | T_A | -40 to +85 | °C | With no icing or condensation | |
| Storage temperature | | T_{stg} | -55 to +125 | °C | With no icing or condensation | |
| Soldering temperature (10 s) | | — | 260 | °C | 10 s | |

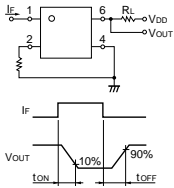
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



■ Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions | |
|-----------------------|--|--------------|-----------|---------|---------|---------------|---|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ | |
| | Reverse current | I_R | — | — | 10 | μA | $V_R = 5\text{ V}$ | |
| | Capacity between terminals | C_T | — | 30 | — | pF | $V = 0, f = 1\text{ MHz}$ | |
| | Trigger LED forward current | I_{FT} | — | 1 | 3 | mA | $I_O = 200\text{ mA}$ | |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | — | 5 | 8 | Ω | $I_F = 5\text{ mA}$, $I_O = 200\text{ mA}$ |
| | | Connection B | — | 3 | 5 | Ω | $I_F = 5\text{ mA}$, $I_O = 200\text{ mA}$ | |
| | | Connection C | — | 1.5 | — | Ω | $I_F = 5\text{ mA}$, $I_O = 400\text{ mA}$ | |
| | Current leakage when the relay is open | I_{LEAK} | — | — | 1.0 | μA | $V_{OFF} = 200\text{ V}$ | |
| | Capacity between I/O terminals | | C_{I-O} | — | 0.8 | — | pF | $f = 1\text{ MHz}$, $V_S = 0\text{ V}$ |
| Insulation resistance | | R_{I-O} | 1,000 | — | — | M Ω | $V_{I-O} = 500\text{ VDC}$, $RoH \leq 60\%$ | |
| Turn-ON time | | t_{ON} | — | 0.6 | 1.5 | ms | $I_F = 5\text{ mA}$, $R_L = 200\text{ }\Omega$, $V_{DD} = 20\text{ V}$ (See note 2.) | |
| Turn-OFF time | | t_{OFF} | — | 0.1 | 1.0 | ms | | |

Note: 2. Turn-ON and Turn-OFF Times



■ Recommended Operating Conditions

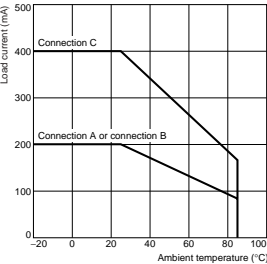
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | — | — | 160 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | — | — | 130 | mA |
| Operating temperature | T_a | -20 | — | 60 | °C |

■ Engineering Data

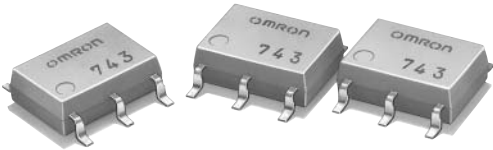
Load Current vs. Ambient Temperature

G3VM-201H1



Slim 2.1mm high relay incorporating a MOSFET Optically Coupled with an Infrared LED in a Miniature, Flat SOP

- Upgraded G3VM-S3 Series.
- Continuous load current of 110 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

■ Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

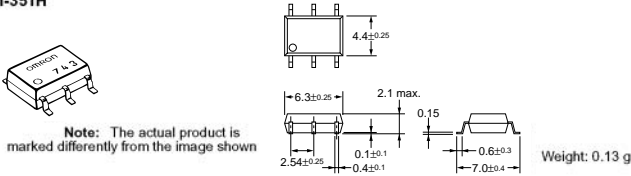
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 350 VAC | G3VM-351H | 75 | --- |
| | | | G3VM-351H(TR) | --- | 2,500 |

■ Dimensions

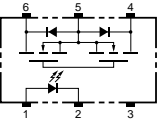
Note: All units are in millimeters unless otherwise indicated.

G3VM-351H



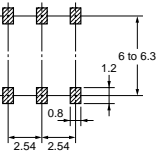
■ Terminal Arrangement/Internal Connections (Top View)

G3VM-351H



■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

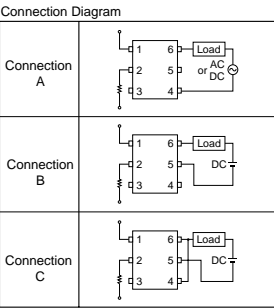
G3VM-351H



Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Rating | Unit | Measurement Conditions | |
|--|-------------------------------------|-----------------------------|--------------------------------|----------------------|-------------------------------|-----------------------------|
| Input | LED forward current | I_F | 50 | mA | | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps | |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/ $^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ | |
| | LED reverse voltage | V_R | 5 | V | | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | | |
| Output | Output dielectric strength | | V_{OFF} | 350 | V | |
| | Continuous load current | Connection A | I_O | 110 | mA | |
| | | Connection B | | 110 | | |
| | | Connection C | | 220 | | |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -1.1 | mA/ $^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | | Connection B | | -1.1 | | |
| | | Connection C | | -2.2 | | |
| | Connection temperature | | T_J | 125 | $^\circ\text{C}$ | |
| Dielectric strength between input and output (See note 1.) | | V_{I-O} | 1,500 | Vrms | AC for 1 min | |
| Operating temperature | | T_a | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation | |
| Storage temperature | | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation | |
| Soldering temperature (10 s) | | — | 260 | $^\circ\text{C}$ | 10 s | |

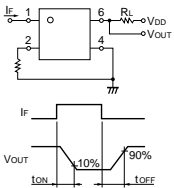
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|--------------|----------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10$ mA |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5$ V |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0$, $f = 1$ MHz |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 110$ mA |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 25 | Ω | $I_F = 5$ mA, $I_O = 110$ mA, $t < 1$ s |
| | | | | --- | 35 | Ω | |
| | | | | --- | 50 | Ω | |
| | | Connection B | | --- | 28 | Ω | $I_F = 5$ mA, $I_O = 110$ mA |
| | | Connection C | | --- | 14 | Ω | $I_F = 5$ mA, $I_O = 220$ mA |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 350$ V |
| Capacity between I/O terminals | | C_{I-O} | --- | 0.8 | --- | pF | $f = 1$ MHz, $V_S = 0$ V |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | M Ω | $V_{I-O} = 500$ VDC, $RoH \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms | $I_F = 5$ mA, $R_L = 200$ Ω , $V_{DD} = 20$ V (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

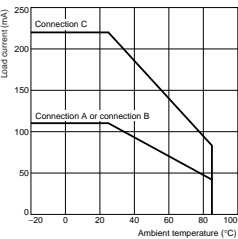
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 10 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 85 | $^\circ\text{C}$ |

Engineering Data

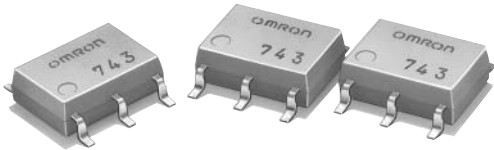
Load Current vs. Ambient Temperature

G3VM-351H



Analog-switching MOS FET Relay with SPST-NC (Single-pole, Single-throw, Normally Closed) Contacts

- New models in 350-V load voltage series with SPST-NC contacts and a 6-pin SOP package.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

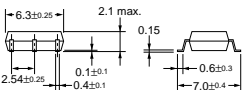
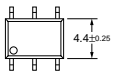
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NC | Surface-mounting terminals | 350 VAC | G3VM-353H | 75 | --- |
| | | | G3VM-353H(TR) | --- | 2,500 |

Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-353H

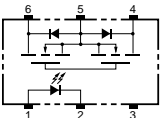


Note: The actual product is marked differently from the image shown here.

Weight: 0.13 g

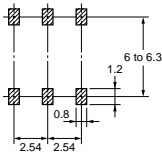
Terminal Arrangement/Internal Connections (Top View)

G3VM-353H



Actual Mounting Pad Dimensions (Recommended Value, Top View)

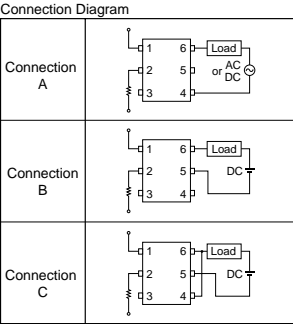
G3VM-353H



■ Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|-----------------------------|--------------------------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C | Ta \geq 25°C |
| | LED reverse voltage | V_R | 5 | V | |
| | Connection temperature | T_J | 125 | °C | |
| Output | Output dielectric strength | V_{OFF} | 350 | V | |
| | Continuous load current | Connection A | I_O | 120 | mA |
| | | Connection B | | 120 | |
| | | Connection C | | 240 | |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | | Connection B | | -1.2 | |
| | | Connection C | | -2.4 | |
| | Connection temperature | T_J | 125 | °C | |
| Dielectric strength between input and output (See note 1.) | | V_{IO} | 1,500 | Vrms | AC for 1 min |
| Operating temperature | | T_a | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | | T_{stg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | | --- | 280 | °C | 10 s |

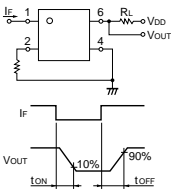
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



■ Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|--------------|----------|---------|---------|------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10$ mA |
| | Reverse current | I_R | --- | --- | 10 | μ A | $V_R = 5$ V |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0$, $f = 1$ MHz |
| | Trigger LED forward current | I_{FT} | --- | 1.0 | 3.0 | mA | $I_{OFF} = 10$ μ A |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 15 | Ω | $I_O = 120$ mA |
| | | Connection B | | --- | 8 | Ω | $I_O = 120$ mA |
| | | Connection C | | --- | 4 | Ω | $I_O = 240$ mA |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μ A | $V_{OFF} = 350$ V, $I_F = 5$ mA |
| Capacity between I/O terminals | | C_{IO} | --- | 0.6 | --- | pF | $f = 1$ MHz, $V_S = 0$ V |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | M Ω | $V_{IO} = 500$ VDC, $RoH \geq 80\%$ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms | $I_F = 5$ mA, $R_L = 200$ Ω , $V_{DD} = 20$ V (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | --- | 3.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



■ Recommended Operating Conditions

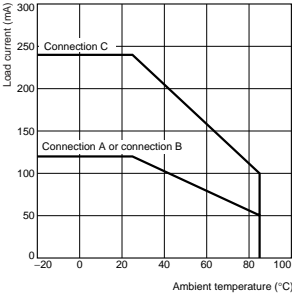
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

■ Engineering Data

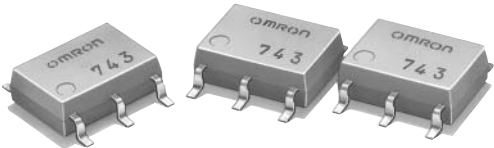
Load Current vs. Ambient Temperature

G3VM-353H



Expanded Range of Analog Switching MOSFET Relays with 400-V Load Voltage

- New models with a 6-pin SOP package now included in 400-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

■ Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

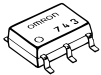
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO | Surface-mounting terminals | 400 VAC | G3VM-401H | 75 | --- |
| | | | G3VM-401H(TR) | --- | 2,500 |

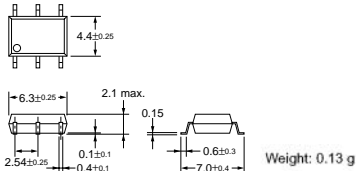
■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-401H

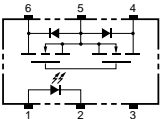


Note: The actual product is marked differently from the image shown here.



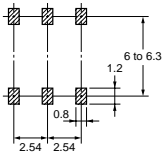
■ Terminal Arrangement/Internal Connections (Top View)

G3VM-401H



■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

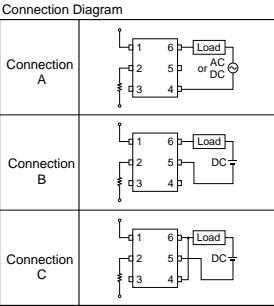
G3VM-401H



■ Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Rating | Unit | Measurement Conditions | |
|--|-------------------------------------|-----------------------------|--------------------------------|----------------------|-------------------------------|----------------------------|
| Input | LED forward current | I_F | 50 | mA | | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps | |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/ $^\circ\text{C}$ | Ta $\geq 25^\circ\text{C}$ | |
| | LED reverse voltage | V_R | 5 | V | | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | | |
| Output | Output dielectric strength | | V_{OFF} | 400 | V | |
| | Continuous load current | Connection A | I_O | 120 | mA | |
| | | Connection B | | 120 | | |
| | | Connection C | | 240 | | |
| | ON current reduction rate | Connection A | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/ $^\circ\text{C}$ | Ta $\geq 25^\circ\text{C}$ |
| | | Connection B | | -1.2 | | |
| | | Connection C | | -2.4 | | |
| | Connection temperature | | T_J | 125 | $^\circ\text{C}$ | |
| Dielectric strength between input and output (See note 1.) | | V_{IO} | 1,500 | Vrms | AC for 1 min | |
| Operating temperature | | T_A | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation | |
| Storage temperature | | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation | |
| Soldering temperature (10 s) | | — | 260 | $^\circ\text{C}$ | 10 s | |

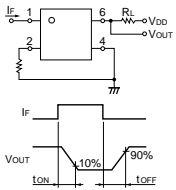
Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.



■ Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions | |
|-----------------------|--|--------------|-----------|---------|---------|---------------|---|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ | |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ | |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ | |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 120\text{ mA}$ | |
| Output | Maximum resistance with output ON | Connection A | R_{ON} | --- | 17 | 35 | Ω | $I_F = 5\text{ mA}$ $I_O = 120\text{ mA}$ |
| | | Connection B | --- | 11 | 20 | Ω | $I_F = 5\text{ mA}$ $I_O = 120\text{ mA}$ | |
| | | Connection C | --- | 6 | --- | Ω | $I_F = 5\text{ mA}$ $I_O = 240\text{ mA}$ | |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 400\text{ V}$ | |
| | Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} = 500\text{ VDC}$, $RoH \leq 60\%$ | |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms | $I_F = 5\text{ mA}$, $R_L = 200\ \Omega$, $V_{DD} = 20\text{ V}$ (See note 2.) | |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms | | |

Note: 2. Turn-ON and Turn-OFF Times



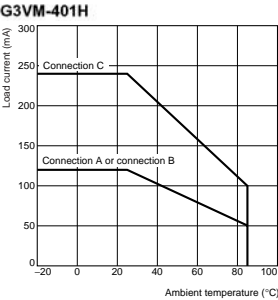
■ Recommended Operating Conditions

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

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | Ta | -20 | --- | 85 | $^\circ\text{C}$ |

■ Engineering Data

Load Current vs. Ambient Temperature



New Analog-switching MOSFET Relays with 2 Output channels.
Dielectric Strength of 2.5 kVAC between I/O.

- Switches minute analog signals.
- Dielectric strength of 2,500 Vrms between I/O.
- Surface-mounting models included in series.



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

■ Application Examples

- Measurement devices
- Security systems

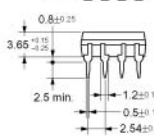
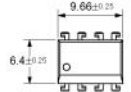
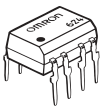
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | PCB terminals | 60 VAC | G3VM-62C1 | 50 | --- |
| | Surface-mounting terminals | | G3VM-62F1 | | |
| | | | G3VM-62F1(TR) | | |
| | | | | --- | 1,500 |

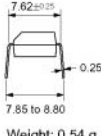
■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-62C1

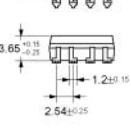
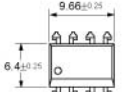
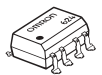


Note: The actual product is marked differently from the image shown here.

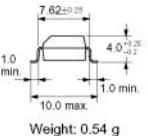


Weight: 0.54 g

G3VM-62F1



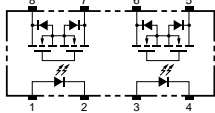
Note: The actual product is marked differently from the image shown here.



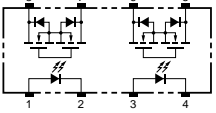
Weight: 0.54 g

■ Terminal Arrangement/Internal Connections (Top View)

G3VM-62C1

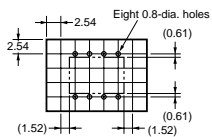


G3VM-62F1



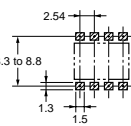
■ PCB Dimensions (Bottom View)

G3VM-62C1



■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-62F1



Absolute Maximum Ratings (Ta = 25°C)

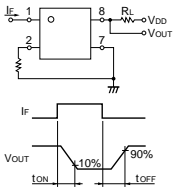
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| | Output dielectric strength | V_{OFF} | 60 | V |
| Output | Continuous load current | I_O | 500 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -5.0 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms |
| Operating temperature | T_a | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | T_{stg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | --- | 260 | °C | 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | µA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 1.0 | 2.0 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | µA |
| | Capacity between I/O terminals | C_{IO} | --- | 0.8 | --- | pF |
| Insulation resistance | R_{IO} | 1,000 | --- | --- | MΩ | $V_{IO} = 500 \text{ VDC}$, $\text{RoH} \leq 60\%$ |
| Turn-ON time | t_{ON} | --- | 0.8 | 2.0 | ms | $I_F = 5 \text{ mA}$, $R_L = 200 \text{ Ω}$, $V_{IO} = 20 \text{ V}$ (See note 2.) |
| Turn-OFF time | t_{OFF} | --- | 0.1 | 0.5 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

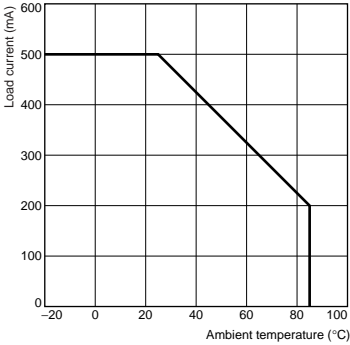
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{IO} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 500 | mA |
| Operating temperature | T_a | -20 | --- | 65 | °C |

Engineering Data

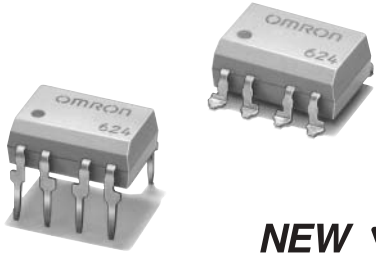
Load Current vs. Ambient Temperature

G3VM-62C1(F1)



New Series with 350-V Load Voltage Including Models with 2 Outputs.

- Upgraded G3VM-W Series.
- Continuous load current of 120 mA.
- Dielectric strength of 2,500 Vrms between I/O.



NEW

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

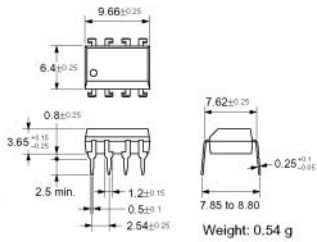
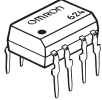
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | PCB terminals | 350 VAC | G3VM-352C | 50 | --- |
| | Surface-mounting terminals | | G3VM-352F | | |
| | | | G3VM-352F(TR) | --- | 1,500 |

Dimensions

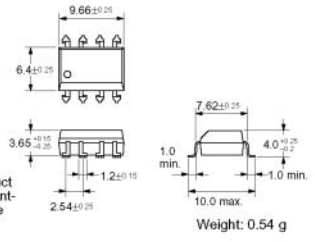
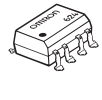
Note: All units are in millimeters unless otherwise indicated.

G3VM-352C



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

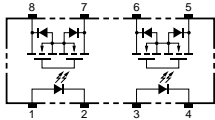
G3VM-352F



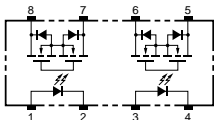
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-352C

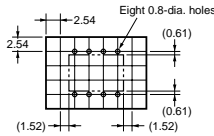


G3VM-352F



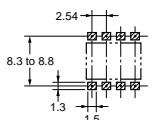
PCB Dimensions (Bottom View)

G3VM-352C



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-352F



■ Absolute Maximum Ratings (Ta = 25°C)

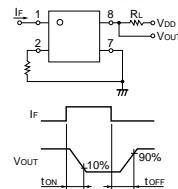
| | Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|-------------|----------------------------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| Output | Output dielectric strength | V_{OFF} | 350 | V | |
| | Continuous load current | I_O | 120 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| Dielectric strength between input and output (See note 1.) | | $V_{I/O}$ | 2,500 | Vrms | AC for 1 min |
| Operating temperature | | T_R | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation |
| Storage temperature | | T_{sig} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation |
| Soldering temperature (10 s) | | --- | 260 | $^\circ\text{C}$ | 10 s |

Note: 1. 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.

■Electrical Characteristics (Ta = 25°C)

| | Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10 \text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5 \text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1 \text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 120 \text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 25 | 35 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}, t < 1 \text{ s}$ |
| | | | --- | 35 | 50 | Ω | $I_F = 5 \text{ mA}$ $I_O = 120 \text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 350 \text{ V}$ |
| Capacity between I/O terminals | | C_{IO} | --- | 0.8 | --- | pF | $f = 1 \text{ MHz}, V_S = 0 \text{ V}$ |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | M Ω | $V_{ILO} = 500 \text{ VDC}$ $RoH \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1.0 | ms | $I_F = 5 \text{ mA}, R_L = 200 \Omega$ |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1.0 | ms | $V_{DD} = 20 \text{ V}$ (See note 2.) |

Note: 2. Turn-ON and Turn-OFF Times



■ Recommended Operating Conditions

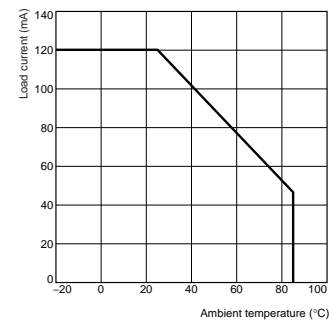
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{D0} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | - 20 | --- | 65 | °C |

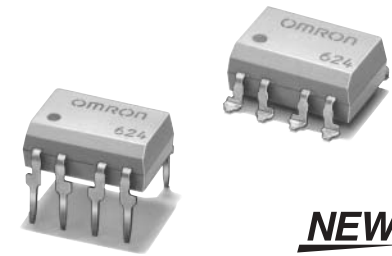
■ Engineering Data

Load Current vs. Ambient Temperature

G3VM-352C(F)



**New Series with 350-V Load Voltage
Current-limiting Models with
2 Outputs.**



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

■ Application Examples

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

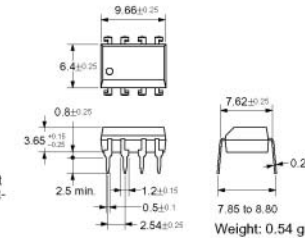
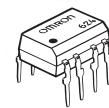
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Current limit | Number per stick | Number per tape |
|--------------|-------------------------------|------------------------------|--------------|---------------|------------------|-----------------|
| DPST-NO | PCB terminals | 350 VAC | G3VM-WL | Yes | 50 | --- |
| | Surface-mounting terminals | | G3VM-WFL | | --- | 1,500 |
| | | | G3VM-WFL(TR) | | | |

■ Dimensions

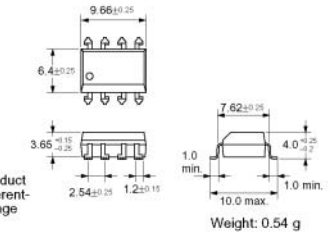
Note: All units are in millimeters unless otherwise indicated.

G3VM-WL



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

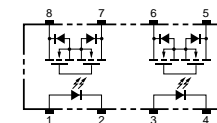
G3VM-WFL



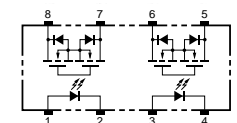
Note: The actual product is marked differently from the image shown here.

■ Terminal Arrangement/Internal Connections (Top View)

G3VM-WL

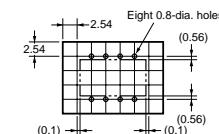


G3VM-WFL



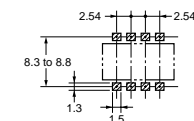
■ PCB Dimensions (Bottom View)

G3VM-WL



■ Actual Mounting Pad Dimensions
(Recommended Value, Top View)

G3VM-WFL



Absolute Maximum Ratings (Ta = 25°C)

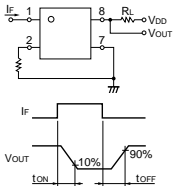
| Item | | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|-------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C | Ta \geq 25°C |
| | LED reverse voltage | V_R | 6 | V | |
| | Connection temperature | T_J | 125 | °C | |
| Output | Output dielectric strength | V_{OFF} | 350 | V | |
| | Continuous load current | I_O | 120 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C | Ta \geq 25°C |
| | Connection temperature | T_J | 125 | °C | |
| Dielectric strength between input and output (See note 1.) | | $V_{I/O}$ | 2,500 | Vrms | AC for 1 min |
| Operating temperature | | T_B | -40 to +85 | °C | With no icing or condensation |
| Storage temperature | | T_{slg} | -55 to +125 | °C | With no icing or condensation |
| Soldering temperature (10 s) | | --- | 260 | °C | 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| | Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $I_O = 120\text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 22 | 35 | Ω | $I_F = 5\text{ mA},$ $I_O = 120\text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 350\text{ V}$ |
| Limit current | | I_{LIM} | 150 | --- | 300 | mA | $I_F = 5\text{ mA},$ $V_{DD} = 5\text{ V}, t = 5\text{ ms}$ |
| Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} = 500\text{ VDC},$ $RoH \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms | $I_F = 5\text{ mA}, R_L = 200\ \Omega,$ $V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | --- | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

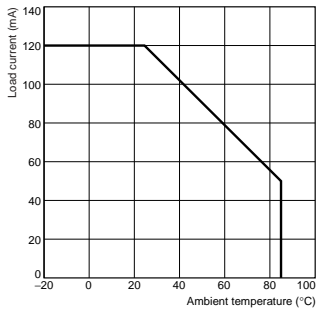
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DO} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_B | -20 | --- | 85 | °C |

Engineering Data

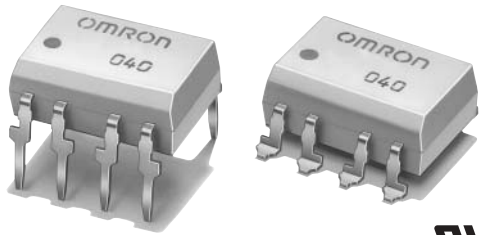
Load Current vs. Ambient Temperature

G3VM-W(F)L



Analog-switching MOSFET Relay with DPST-NC (Double-pole, Single-throw, Normally Closed) Contacts

- Switches minute analog signals.
- Switching AC and DC.



Application Examples

- Electronic automatic exchange systems
- Security systems
- Datcom (modem) systems
- FA systems
- Measurement devices

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

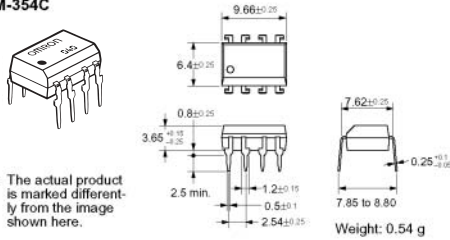
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NC | PCB terminals | 350 VAC | G3VM-354C | 50 | --- |
| | Surface-mounting terminals | | G3VM-354F | --- | --- |
| | | | G3VM-354F(TR) | --- | 1,500 |

Dimensions

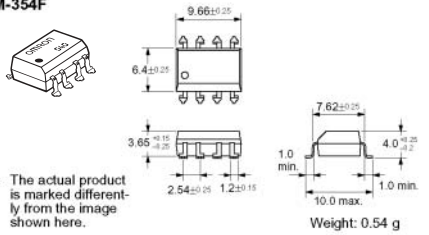
Note: All units are in millimeters unless otherwise indicated.

G3VM-354C



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

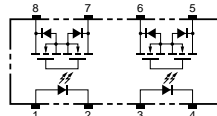
G3VM-354F



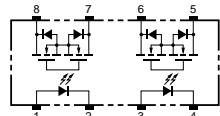
Note: The actual product is marked differently from the image shown here.

Terminal Arrangement/Internal Connections (Top View)

G3VM-354C

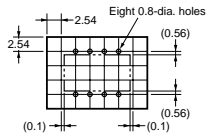


G3VM-354F



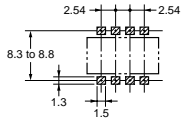
PCB Dimensions (Bottom View)

G3VM-354C



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-354F



■ Absolute Maximum Ratings (Ta = 25°C)

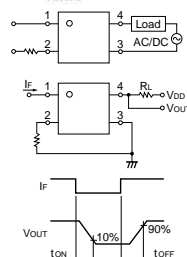
| | Item | Symbol | Rating | Unit | Measurement Conditions |
|--------|--|--------------------------------|-------------|----------------------------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V | |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| Output | Output dielectric strength | V_{OFF} | 350 | V | |
| | Continuous load current | I_O | 150 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.5 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ | |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms | AC for 1 min |
| | Operating temperature | T_a | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation |
| | Storage temperature | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation |
| | Soldering temperature (10 s) | — | 260 | $^\circ\text{C}$ | 10 s |

Note: 1. 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.

■Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10 \text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5 \text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1 \text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | $V_{OFF} = 10 \mu\text{A}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 15 | 25 | Ω | $I_O = 150 \text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $I_F = 5 \text{ mA}, V_{OFF} = 350 \text{ V}$ |
| Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF | $f = 1 \text{ MHz}, V_S = 0 \text{ V}$ |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} = 500 \text{ VDC}, \text{RoH} \leq 60\%$ |
| Turn-ON time | | t_{ON} | --- | 0.1 | 1.0 | ms | $I_F = 5 \text{ mA}, R_L = 200 \Omega, V_{OFF} = 20 \text{ V}$ (See note 2.) |
| Turn-OFF time | | t_{OFF} | --- | 1.0 | 3.0 | ms | |

Note: 2. Turn-ON and Turn-OFF



■ Recommended Operating Conditions

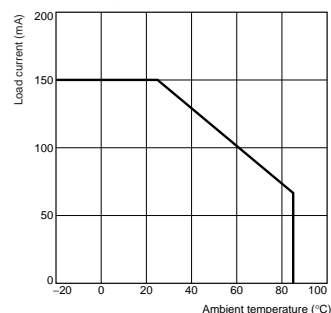
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 150 | mA |
| Operating temperature | T_A | -20 | --- | 65 | °C |

■ Engineering Data

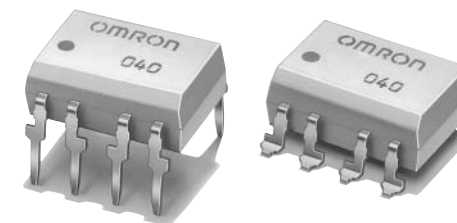
Load Current vs. Ambient Temperature

G3VM-354C(F)



New MOSFET Relay with Both SPST-NO and SPST-NC Contacts Incorporated in a Single DIP Package

- SPST-NO/SPST-NC models now included in the 350-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 2,500 Vrms between I/O.



NEW  Approval pending

■ Application Examples

- Measurement devices
- Security systems
- Amusement machines

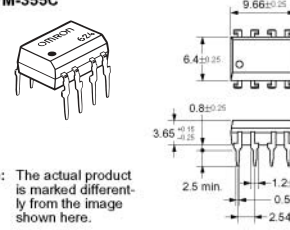
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|---------------------|-------------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO/ SPST-NC | PCB terminals | 350 VAC | G3VM-355C | 50 | --- |
| | Surface-mounting terminals | | G3VM-355F | | |
| | | | G3VM-355F(TR) | --- | 1,500 |

■ Dimensions

Note: All units are in millimeters unless otherwise indicated

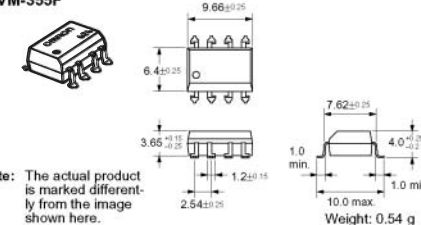
G3VM-355C



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

Weight: 0.54 g

G3VM-355F

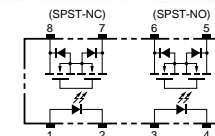


Note: The actual product is marked differently from the image shown here.

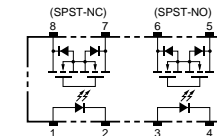
Weight: 0.54 g

■ Terminal Arrangement/Internal Connections (Top View)

G3VM-355C

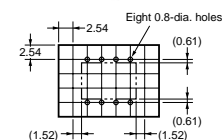


G3VM-355F



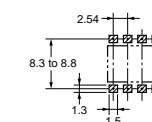
■ PCB Dimensions (Bottom View)

G3VM-355C



■ Actual Mounting Pad Dimensions
(Recommended Value, Top View)

G3VM-355F



Absolute Maximum Ratings (Ta = 25°C)

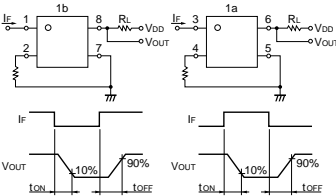
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--------|--|--------------------------------|-------|------------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Output dielectric strength | V_{OFF} | 350 | V |
| Output | Continuous load current | I_O | 100 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.0 | $\text{mA}/^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms |
| | | | | AC for 1 min |
| | | | | Operating temperature |
| | | | | Storage temperature |
| | | | | Soldering temperature (10 s) |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|-----------|---------|---------|---------------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10\text{ mA}$ |
| | Reverse current | I_R | --- | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | --- | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA | SPST-NO: $I_O = 100\text{ mA}$ SPST-NC: $I_{OFF} = 10\text{ }\mu\text{A}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 30 | 35 | Ω | SPST-NO: $I_F = 5\text{ mA}$, $I_O = 100\text{ mA}$ |
| | | | | 40 | 50 | | SPST-NC: $I_F = 0\text{ mA}$, $I_O = 100\text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA | $V_{OFF} = 350\text{ V}$ |
| | Capacity between I/O terminals | | $C_{I/O}$ | --- | 0.8 | --- | pF |
| Insulation resistance | | $R_{I/O}$ | 1,000 | --- | --- | M Ω | $V_{I/O} \leq 500\text{ VDC}$, $\text{RoH} \leq 60\%$ |
| Turn-ON time | SPST-NO | t_{ON} | --- | 0.25 | 1.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega$, $V_{DD} = 20\text{ V}$ (See note 2.) |
| | SPST-NC | t_{ON} | --- | 0.3 | 1.0 | ms | |
| Turn-OFF time | SPST-NO | t_{OFF} | --- | 0.5 | 1.0 | ms | |
| | SPST-NC | t_{OFF} | --- | 0.15 | 1.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



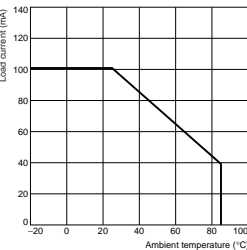
Recommended Operating Conditions

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

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 10 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_A | -20 | --- | 85 | $^\circ\text{C}$ |

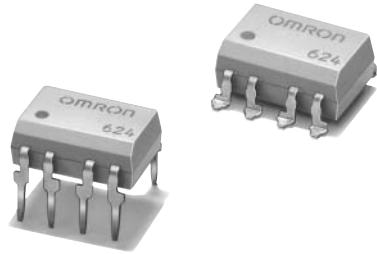
Engineering Data

Load Current vs. Ambient Temperature
G3VM-355C(F)



New Expanded Range of Analog switching MOSFET Relays with 400-V Load Voltage with 2 Output Channels.

- A 2-channel Relay now included in the 400-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 2,500 Vrms between I/O.



NEW Approval pending

Application Examples

- Measurement devices
- Security systems
- Amusement machines

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

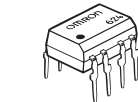
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | PCB terminals | 400 VAC | G3VM-402C | 50 | --- |
| | Surface-mounting terminals | | G3VM-402F | | |
| | | | G3VM-402F(TR) | | |

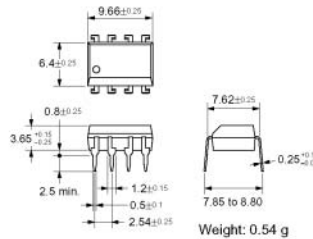
Dimensions

Note: All units are in millimeters unless otherwise indicated.

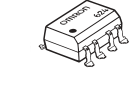
G3VM-402C



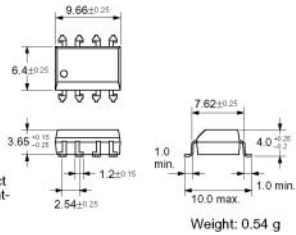
Note: The actual product is marked differently from the image shown here.



G3VM-402F

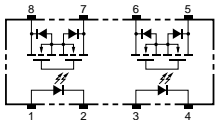


Note: The actual product is marked differently from the image shown here.

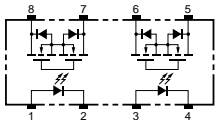


Terminal Arrangement/Internal Connections (Top View)

G3VM-402C

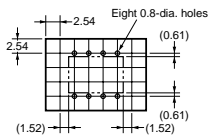


G3VM-402F



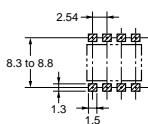
PCB Dimensions (Bottom View)

G3VM-402C



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-402F



Absolute Maximum Ratings (Ta = 25°C)

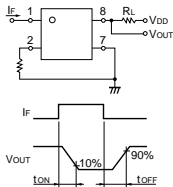
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------------|------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 400 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 2,500 | Vrms |
| Operating temperature | | T_A | -40 to +85 | °C |
| Storage temperature | | T_{stg} | -55 to +125 | °C |
| Soldering temperature (10 s) | | --- | 280 | °C |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | µA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 18 | 35 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | µA |
| Capacity between I/O terminals | | C_{IO} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | --- | 1.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | --- | 1.0 | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

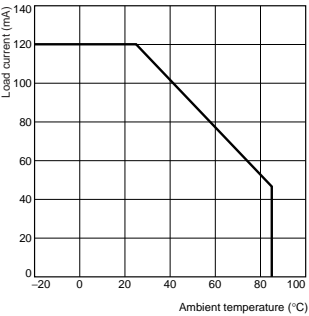
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_A | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-402C(F)



New MOSFET Relay Designed for Switching Minute Signals and Analog Signals. Has 2 Channels and a 60-V Load Voltage

- Continuous load current of 400 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data Loggers
- Amusement machines

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

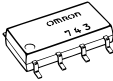
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | Surface-mounting terminals | 60 VAC | G3VM-62J1 | 50 | --- |
| | | | G3VM-62J1(TR) | --- | 2,500 |

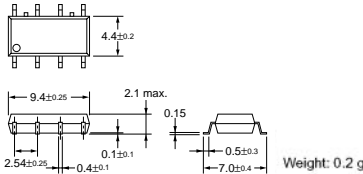
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-62J1

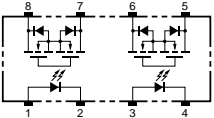


Note: The actual product is marked differently from the image shown here.



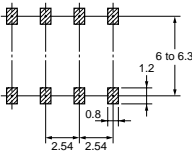
Terminal Arrangement/Internal Connections (Top View)

G3VM-62J1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-62J1



Absolute Maximum Ratings (Ta = 25°C)

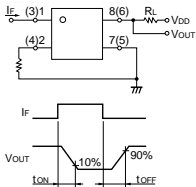
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------|--------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 60 | V |
| | Continuous load current | I_O | 400 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -4.0 | mA/°C |
| | Dielectric strength between input and output (See note 1.) | V_{I-O} | 1,500 | Vrms |
| Operating temperature | | | | T_a -40 to +85 °C |
| Storage temperature | | | | T_{stg} -55 to +125 °C |
| Soldering temperature (10 s) | | | | 260 °C |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | µA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1.6 | 3 | mA |
| | Maximum resistance with output ON | R_{ON} | --- | 1.0 | 2.0 | Ω |
| Output | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | µA |
| | Capacity between I/O terminals | C_{I-O} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | 0.8 | 2.0 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 0.5 | ms |

Note: 2. Turn-ON and Turn-OFF Times



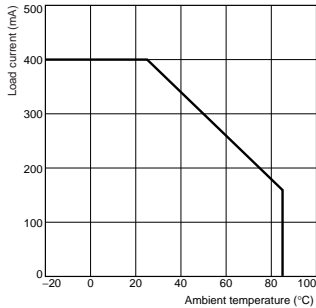
Recommended Operating Conditions

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

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 48 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 400 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature
G3VM-62J1



Slim, 2.1-mm High MOSFET Relay with Miniature, Flat, 8-pin SOP Package

- New models with 2 channels and an 8-pin SOP package now available in the 200-V load voltage series.
- Continuous load current of 200 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

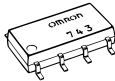
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|----------------|------------------|-----------------|
| DPST-NO | Surface-mounting terminals | 200 VAC | G3VM-202J1 | 50 | --- |
| | | | G3VM-202J1(TR) | --- | 2,500 |

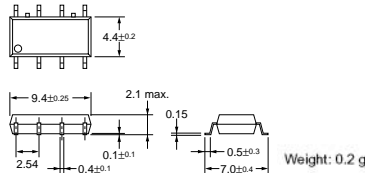
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-202J1

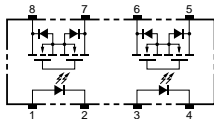


Note: The actual product is marked differently from the image shown here.



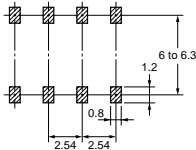
Terminal Arrangement/Internal Connections (Top View)

G3VM-202J1



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-202J1



■ Absolute Maximum Ratings (Ta = 25°C)

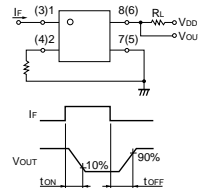
| | Item | Symbol | Rating | Unit | Measurement Conditions |
|--------|--|--------------------------------|-------------|----------------------------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA | |
| | Repetitive peak LED forward current | I_{FP} | 1 | A | 100 μ s pulses, 100 pps |
| | Δ LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | LED reverse voltage | V_{RL} | 5 | V | |
| | Connection temperature | T_i | 125 | $^\circ\text{C}$ | |
| Output | Output diodeic strength | V_{OFF} | 200 | V | |
| | Continuous load current | I_O | 200 | mA | |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -2.0 | $\text{mA}/^\circ\text{C}$ | $T_a \geq 25^\circ\text{C}$ |
| | Dielectric strength between input and output (See note 1.) | V_{iO} | 1,500 | Vrms | AC for 1 min |
| | Operating temperature | T_a | -40 to +85 | $^\circ\text{C}$ | With no icing or condensation |
| | Storage temperature | T_{stg} | -55 to +125 | $^\circ\text{C}$ | With no icing or condensation |
| | Soldering temperature (10 s) | --- | 260 | $^\circ\text{C}$ | 10 s |

Note: 1. 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.

■Electrical Characteristics (Ta = 25°C)

| | Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V | $I_F = 10 \text{ mA}$ |
| | Reverse current | I_R | — | — | 10 | μA | $V_R = 5 \text{ V}$ |
| | Capacity between terminals | C_{T1} | — | 30 | — | pF | $V = 0, f = 1 \text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | — | 1 | 3 | mA | $I_O = 200 \text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | — | 5 | 8 | Ω | $I_F = 5 \text{ mA}$ $I_O = 200 \text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | — | — | 1.0 | μA | $V_{OFF} = 200 \text{ V}$ |
| | Capacity between I/O terminals | C_{IO} | — | 0.8 | — | pF | $f = 1 \text{ MHz}, V_S = 0 \text{ V}$ |
| Insulation resistance | | R_{LO} | 1,000 | — | — | M Ω | $V_{LO} = 500 \text{ VDC}$, $R_{RH} \leq 80\%$ |
| Turn-ON time | | t_{ON} | — | 0.6 | 1.5 | ms | $I_F = 5 \text{ mA}, R_L = 200 \Omega$ |
| Turn-OFF time | | t_{OFF} | — | 0.1 | 1 | ms | $V_{IO} = 20 \text{ V}$ (See note 2.) |

Note: 2. Turn-ON and Turn-OFF Times



■ Recommended Operating Conditions

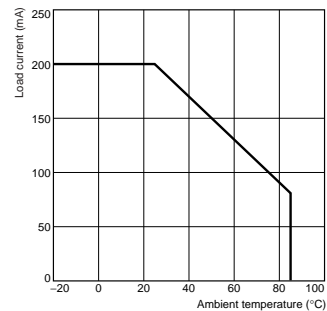
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | 150 | 200 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 130 | mA |
| Operating temperature | T_A | -20 | --- | 85 | °C |

■ Engineering Data

Load Current vs. Ambient Temperature

G3VM-202J1

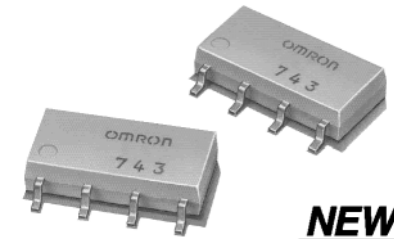


Slim, 2.1-mm High Relay Incorporating a MOSFET Optically Coupled with an Infrared LED in a Miniature, Flat SOP Package

- New models with 2 channels and an 8-pin SOP package included in 350-V load voltage series.

■ Continuous load current of 110 mA.

- Dielectric strength of 1,500 Vrms between I/O.

**NEW 91**

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

■ Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

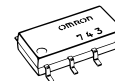
■ List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | Surface-mounting terminals | 350 VAC | G3VM-352J | 50 | --- |
| | | | G3VM-352J(TR) | --- | 2,500 |

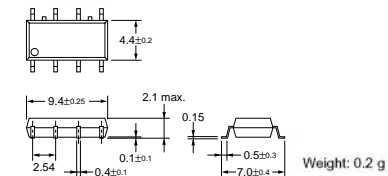
■ Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-352J

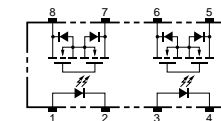


Note: The actual product is marked differently from the image shown here.



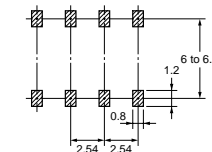
■ Terminal Arrangement/Internal Connections (Top View)

G3VM-352J



■ Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-352J



Absolute Maximum Ratings (Ta = 25°C)

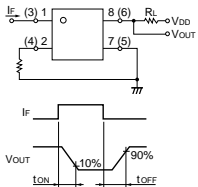
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 110 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.1 | mA/°C |
| Dielectric strength between input and output (See note 1.) | | | | V_{I-O} 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_a -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{stg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | --- 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | µA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| Output | Maximum resistance with output ON | R_{ON} | --- | 25 | 35 | Ω |
| | | | --- | 35 | 50 | Ω |
| | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | µA |
| | Capacity between I/O terminals | C_{I-O} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{I-O} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1 | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

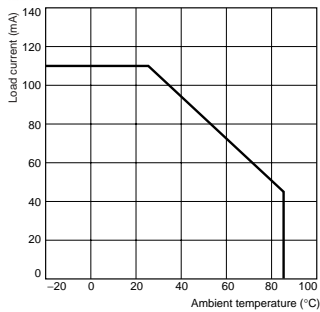
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 10 | 25 | mA |
| Continuous load current | I_O | --- | --- | 100 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-352J



Analog-switching MOSFET Relay with DPST-NC (Double-pole, Single-throw, Normally Closed) Contacts

- New models with SPST-NC contacts and an 8-pin SOP package now included in 350-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

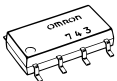
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NC | Surface-mounting terminals | 350 VAC | G3VM-354J | 50 | --- |
| | | | G3VM-354J(TR) | --- | 2,500 |

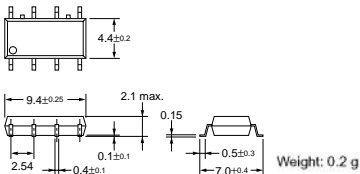
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-354J

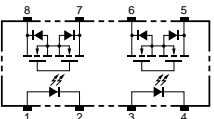


Note: The actual product is marked differently from the image shown here.



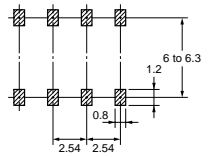
Terminal Arrangement/Internal Connections (Top View)

G3VM-354J



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-354J



Absolute Maximum Ratings (Ta = 25°C)

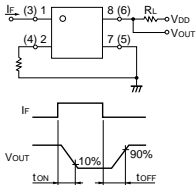
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--|-------------------------------------|--------------------------------|------|--|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| Output | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 120 | mA |
| | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Connection temperature | T_J | 125 | °C |
| Dielectric strength between input and output (See note 1.) | | | | $V_{I/O}$ 1,500 Vrms AC for 1 min |
| Operating temperature | | | | T_B -40 to +85 °C With no icing or condensation |
| Storage temperature | | | | T_{slg} -55 to +125 °C With no icing or condensation |
| Soldering temperature (10 s) | | | | 260 °C 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|-----------------|------|---|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | 1 | 3 | mA | $I_{OFF} = 10\text{ μA}$ |
| Output | Maximum resistance with output ON | R_{ON} | 15 | 25 | Ω | $I_O = 120\text{ mA}$ |
| | Current leakage when the relay is open | I_{LEAK} | --- | 1.0 | μA | $V_{OFF} = 350\text{ V}, I_F = 5\text{ mA}$ |
| Capacity between I/O terminals | | | | $C_{I/O}$ 0.8 | pF | $f = 1\text{ MHz}, V_s = 0\text{ V}$ |
| Insulation resistance | | | | $R_{I/O}$ 1,000 | MΩ | $V_{I/O} = 500\text{ VDC}, \text{RoH} \leq 60\%$ |
| Turn-ON time | | | | t_{ON} 1.0 | ms | $I_F = 5\text{ mA}, R_L = 200\text{ Ω}, V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | | | | t_{OFF} 3.0 | ms | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

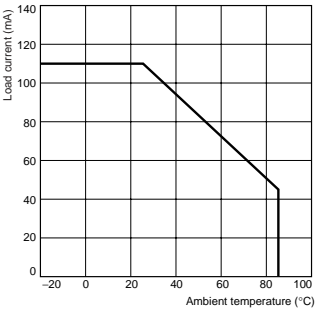
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|-----------|---------|---------|---------|------|
| Output dielectric strength | V_{DIO} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | --- | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_B | -20 | --- | 85 | °C |

Engineering Data

Load Current vs. Ambient Temperature

G3VM-354J



New MOSFET Relay with Both SPST-NO and SPST-NC Contacts Incorporated in a Single SOP Package

- SPST-NO/SPST-NC models with an 8-pin SOP package now available in the 350-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

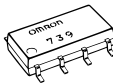
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|-----------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| SPST-NO/SPST-NC | Surface-mounting terminals | 350 VAC | G3VM-355J | 50 | --- |
| | | | G3VM-355J(TR) | --- | 2,500 |

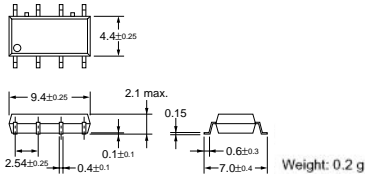
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-355J

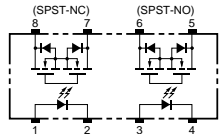


Note: The actual product is marked differently from the image shown here.



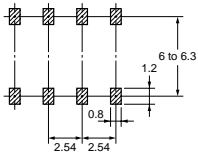
Terminal Arrangement/Internal Connections (Top View)

G3VM-355J



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-355J



Absolute Maximum Ratings (Ta = 25°C)

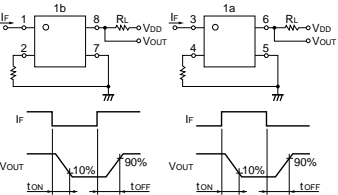
| Item | Symbol | Rating | Unit | Measurement Conditions |
|--------|--|--------------------------------|-------|-------------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | $\text{mA}/^\circ\text{C}$ |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Output dielectric strength | V_{OFF} | 350 | V |
| | Continuous load current | I_O | 90 | mA |
| Output | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -0.9 | $\text{mA}/^\circ\text{C}$ |
| | Connection temperature | T_J | 125 | $^\circ\text{C}$ |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 1,500 | Vrms |
| | | | | AC for 1 min |
| | | | | With no icing or condensation |
| | | | | With no icing or condensation |
| | | | | 10 s |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|--------------------------------|--|------------|---------|---------|---------------|--|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | 10 | μA | $V_R = 5\text{ V}$ |
| | Capacity between terminals | C_T | --- | 30 | pF | $V = 0, f = 1\text{ MHz}$ |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| | | I_{FC} | | | | SPST-NO: $I_O = 90\text{ mA}$ |
| | | | | | | SPST-NC: $I_{OFF} = 10\text{ }\mu\text{A}$ |
| | | | | | | SPST-NO: $I_F = 5\text{ mA}, I_O = 90\text{ mA}$ |
| Output | Maximum resistance with output ON | R_{ON} | --- | 30 | 40 | Ω |
| | | | | 35 | 50 | |
| | Current leakage when the relay is open | I_{LEAK} | --- | 1.0 | μA | $V_{OFF} = 350\text{ V}$ |
| Capacity between I/O terminals | | C_{LO} | --- | 0.8 | pF | $f = 1\text{ MHz}, V_S = 0\text{ V}$ |
| Insulation resistance | | R_{LO} | 1,000 | --- | M Ω | $V_{IO} = 500\text{ VDC}, \text{RoH} \leq 60\%$ |
| Turn-ON time | SPST-NO | t_{ON} | --- | 0.25 | 1.0 | ms |
| | SPST-NC | | --- | 0.3 | 1.0 | ms |
| | | | | | | $I_F = 5\text{ mA}, R_L = 200\text{ }\Omega, V_{DD} = 20\text{ V}$ (See note 2.) |
| Turn-OFF time | SPST-NO | t_{OFF} | --- | 0.5 | 1.0 | ms |
| | SPST-NC | | --- | 0.15 | 1.0 | ms |
| | | | | | | |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

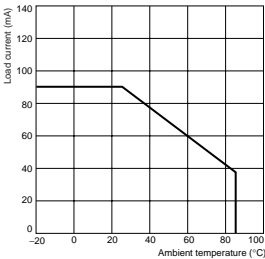
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------------------|
| Output dielectric strength | V_{DD} | --- | --- | 280 | V |
| Operating LED forward current | I_F | 5 | 10 | 25 | mA |
| Continuous load current | I_O | --- | --- | 90 | mA |
| Operating temperature | T_A | -20 | --- | 85 | $^\circ\text{C}$ |

Engineering Data

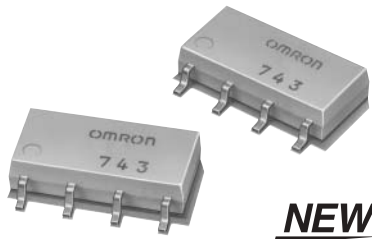
Load Current vs. Ambient Temperature

G3VM-355J



Expanded Range of Analog-Switching MOSFET Relays with 400-V Load Voltage

- New models with two channels and an 8-pin SOP package included in 400-V load voltage series.
- Continuous load current of 120 mA.
- Dielectric strength of 1,500 Vrms between I/O.



NEW

Application Examples

- Broadband systems
- Measurement devices
- Data loggers
- Amusement machines

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

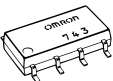
List of Models

| Contact form | Terminals | Load voltage (peak value) | Model | Number per stick | Number per tape |
|--------------|----------------------------|---------------------------|---------------|------------------|-----------------|
| DPST-NO | Surface-mounting terminals | 400 VAC | G3VM-402J | 50 | --- |
| | | | G3VM-402J(TR) | --- | 2,500 |

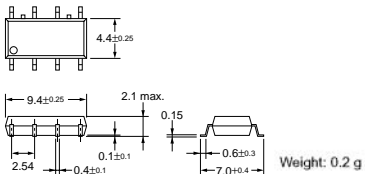
Dimensions

Note: All units are in millimeters unless otherwise indicated.

G3VM-402J

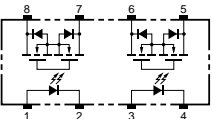


Note: The actual product is marked differently from the image shown here.



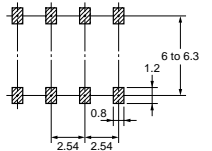
Terminal Arrangement/Internal Connections (Top View)

G3VM-402J



Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-402J



Absolute Maximum Ratings (Ta = 25°C)

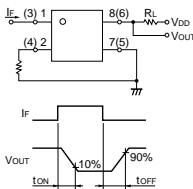
| Item | Symbol | Rating | Unit | Measurement Conditions |
|------------------------------|--|--------------------------------|-------------|------------------------|
| Input | LED forward current | I_F | 50 | mA |
| | Repetitive peak LED forward current | I_{FP} | 1 | A |
| | LED forward current reduction rate | $\Delta I_F/^\circ\text{C}$ | -0.5 | mA/°C |
| | LED reverse voltage | V_R | 5 | V |
| | Connection temperature | T_J | 125 | °C |
| | Output dielectric strength | V_{OFF} | 400 | V |
| | Continuous load current | I_O | 120 | mA |
| Output | ON current reduction rate | $\Delta I_{ON}/^\circ\text{C}$ | -1.2 | mA/°C |
| | Dielectric strength between input and output (See note 1.) | V_{IO} | 1,500 | Vrms AC for 1 min |
| Operating temperature | | T_B | -40 to +85 | °C |
| Storage temperature | | T_{slg} | -55 to +125 | °C |
| Soldering temperature (10 s) | | --- | 260 | °C |

Note: 1. 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.

Electrical Characteristics (Ta = 25°C)

| Item | Symbol | Minimum | Typical | Maximum | Unit | Measurement conditions |
|-----------------------|--|------------|---------|---------|------|------------------------|
| Input | LED forward voltage | V_F | 1.0 | 1.15 | 1.3 | V |
| | Reverse current | I_R | --- | --- | 10 | μA |
| | Capacity between terminals | C_T | --- | 30 | --- | pF |
| | Trigger LED forward current | I_{FT} | --- | 1 | 3 | mA |
| | Maximum resistance with output ON | R_{ON} | --- | 17 | 35 | Ω |
| Output | Current leakage when the relay is open | I_{LEAK} | --- | --- | 1.0 | μA |
| | Capacity between I/O terminals | C_{IO} | --- | 0.8 | --- | pF |
| Insulation resistance | | R_{IO} | 1,000 | --- | --- | MΩ |
| Turn-ON time | | t_{ON} | --- | 0.3 | 1 | ms |
| Turn-OFF time | | t_{OFF} | --- | 0.1 | 1 | ms |

Note: 2. Turn-ON and Turn-OFF Times



Recommended Operating Conditions

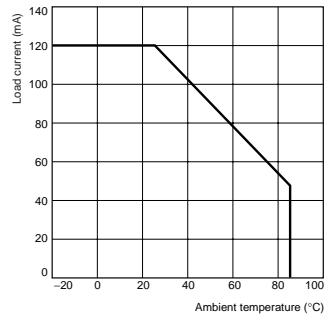
Use the G3VM under the following conditions so that the Relay will operate properly.

| Item | Symbol | Minimum | Typical | Maximum | Unit |
|-------------------------------|----------|---------|---------|---------|------|
| Output dielectric strength | V_{DD} | --- | --- | 320 | V |
| Operating LED forward current | I_F | 5 | 7.5 | 25 | mA |
| Continuous load current | I_O | --- | --- | 120 | mA |
| Operating temperature | T_a | -20 | --- | 85 | °C |

Engineering Data

Load current vs. Ambient Temperature

G3VM-402J



Glossary

CONTACTS

Contact Form

The contact mechanism of the Relay.

Number of Contact Poles

The number of contact circuits.

Rated Load

The rated load of the contact of the Relay, which determines the characteristic performance of the contact of the Relay, is expressed by the switching voltage and switching current.

Maximum Switching Voltage

The switching voltage of the Relay determines the characteristic performance of the contact of the Relay. Do not apply voltage that exceeds the maximum switching voltage of the Relay.

Carry Current

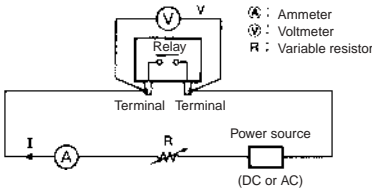
The value of the current which can be continuously applied to the Relay contacts without opening or closing them, which also allows the Relay to stay within the permissible temperature rise limit.

Maximum Switching (Contact) Current

A current which serves as a reference in determining the performance of the Relay contacts. This value will never exceed the carry current. When using a Relay, plan not to exceed this value.

Contact Resistance

The total resistance of the conductor, which includes specific resistivities, such as of the armature and terminal, and the resistance of the contacts. This value is determined by measuring the voltage drop across the contacts by the allowed test current shown in the table below.



Test Current

| Rated current or switched current (A) | Test current (mA) |
|---------------------------------------|-------------------|
| 0.01 or higher but less than 0.1 | 10 |
| 0.1 or higher but less than 1 | 100 |
| 1 or higher | 1,000 |

To measure the contact resistance, a milliohmmeter can also be used, although the accuracy drops slightly.

Contact Symbols

| NO contact | NC contact | SPDT contact |
|-------------------------|-------------------------|---------------------------|
| | | |
| Double-break NO contact | Double-break NO contact | Make-before-break contact |
| | | |
| Wiper contact | Latching Relay contact | Ratchet relay contact |
| | | |

Make-before-break Contact

A contact arrangement in which part of the switching section is shared between both an NO and an NC contact. When the Relay operates or releases, the contact that closes the circuit operates before the contact that opens the circuit releases. Thus both the contacts are closed momentarily at the same time.

Maximum Switching Power

The maximum capacity value of the load which can be switched without causing problems of material break-down and/or electrical overload. When using a Relay, be careful not to exceed this value. For example, when switching voltage V_1 is known, max. switching current I_1 can be obtained at the point of intersection on the characteristic curve "Maximum switching power" below. Conversely, max. switching voltage V_1 can be operated if I_1 is known.

Max. switching current (I_1) =

Maximum switching power $[W(VA)]$
Switching voltage (V_1)

For instance, if the switching voltage = 40 V, the max. switching current = 2 A (see circled point on graph).

