

## MOS FET Relays

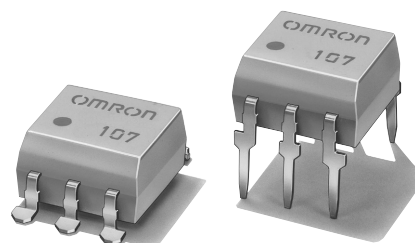
## G3VM-401BY/EY

**Analog-switching MOS FET Relay with Dielectric Strength of 5 kVAC between I/O Using Optical Isolation.**

- Switches minute analog signals.
- Leakage current of 1  $\mu$ A max. when output relay is open.
- RoHS Compliant.

### ■ Application Examples

- Electronic automatic exchange systems
- Measurement devices
- FA systems



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

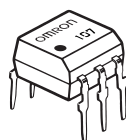
### ■ List of Models

| 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           |

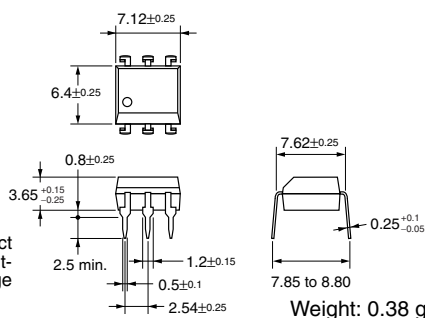
### ■ Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

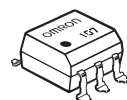
#### G3VM-401BY



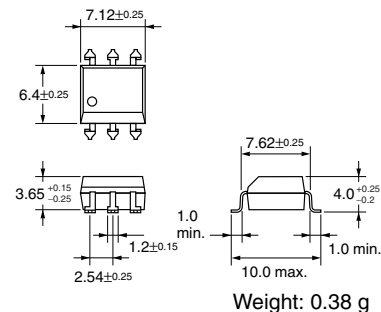
**Note:** The actual product is marked differently from the image shown here.



#### G3VM-401EY

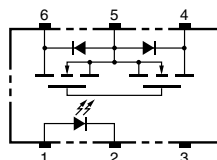


**Note:** The actual product is marked differently from the image shown here.

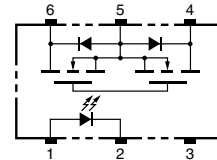


### ■ Terminal Arrangement/Internal Connections (Top View)

#### G3VM-401BY

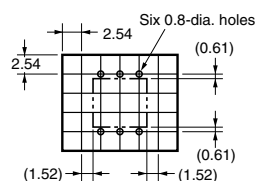


#### G3VM-401EY



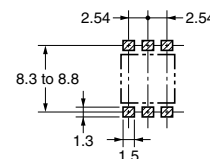
### ■ PCB Dimensions (Bottom View)

#### G3VM-401BY



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

#### G3VM-401EY

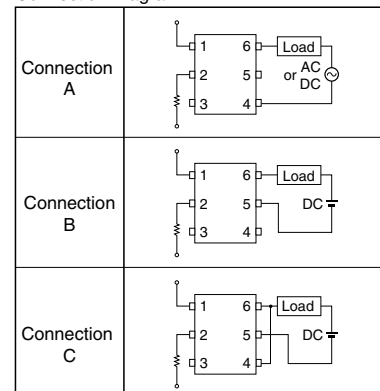


# ■ Absolute Maximum Ratings (Ta = 25°C)

| Item                                                       |                                     | Symbol                      | Rating                         | Unit                 | Measurement conditions        |
|------------------------------------------------------------|-------------------------------------|-----------------------------|--------------------------------|----------------------|-------------------------------|
| Input                                                      | LED forward current                 | $I_F$                       | 50                             | mA                   |                               |
|                                                            | Repetitive peak LED forward current | $I_{FP}$                    | 1                              | A                    | 100 $\mu$ s pulses, 100 pps   |
|                                                            | LED forward current reduction rate  | $\Delta I_F/^\circ\text{C}$ | -0.5                           | mA/ $^\circ\text{C}$ | Ta $\geq$ 25°C                |
|                                                            | LED reverse voltage                 | $V_R$                       | 5                              | V                    |                               |
|                                                            | Connection temperature              | $T_J$                       | 125                            | $^\circ\text{C}$     |                               |
| Output                                                     | Load voltage (AC peak/DC)           | $V_{OFF}$                   | 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/ $^\circ\text{C}$          |
|                                                            |                                     | 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.) |                                     | $V_{I-O}$                   | 5,000                          | $V_{rms}$            | AC for 1 min                  |
| Operating temperature                                      |                                     | $T_\alpha$                  | -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.

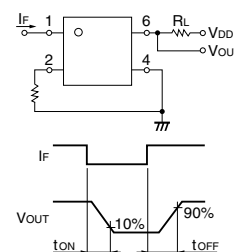
Connection Diagram



# ■ 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             | $I_F = 10$ mA                                                      |
|                                | Reverse current                         | $I_R$        | ---      | ---     | 10      | $\mu\text{A}$ | $V_R = 5$ V                                                        |
|                                | Capacity between terminals              | $C_T$        | ---      | 30      | ---     | pF            | $V = 0$ , $f = 1$ MHz                                              |
|                                | Trigger LED forward current             | $I_{FT}$     | ---      | ---     | 3       | mA            | $I_O = 120$ mA                                                     |
| Output                         | Maximum resistance with output ON       | Connection A | $R_{ON}$ | ---     | 17      | $\Omega$      | $I_F = 5$ mA, $I_O = 120$ mA                                       |
|                                |                                         | Connection B |          | ---     | 11      | $\Omega$      | $I_F = 5$ mA, $I_O = 120$ mA                                       |
|                                |                                         | Connection C |          | ---     | 6       | $\Omega$      | $I_F = 5$ mA, $I_O = 240$ mA                                       |
|                                | Current leakage when the relay is open  | $I_{LEAK}$   | ---      | 0.0004  | 1.0     | $\mu\text{A}$ | $V_{OFF} = 400$ V                                                  |
|                                | Capacity between terminals A Connection | $C_{OFF}$    | ---      | 40      | ---     | pF            | $V = 0$ , $f = 1$ MHz                                              |
| 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    | ---     | ---     | $M\Omega$     | $V_{I-O} = 500$ VDC, $R_{OH} \leq 60\%$                            |
| Turn-ON time                   |                                         | $t_{ON}$     | ---      | 0.3     | 1.0     | ms            | $I_F = 5$ mA, $R_L = 200$ $\Omega$ , $V_{DD} = 20$ V (See note 2.) |
| Turn-OFF time                  |                                         | $t_{OFF}$    | ---      | 0.1     | 1.0     | ms            |                                                                    |

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



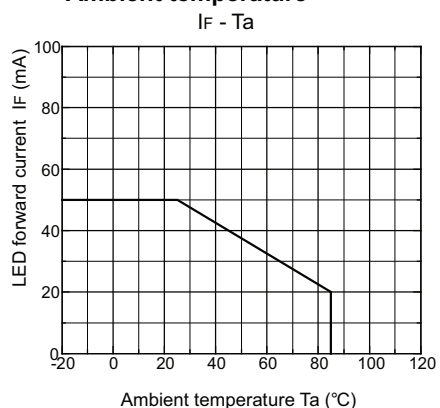
# ■ Recommended Operating Conditions

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

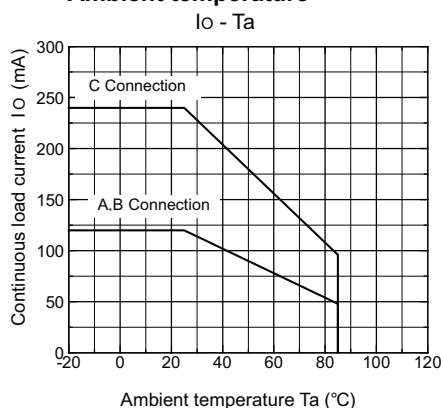
| Item                                 | Symbol             | Minimum | Typical | Maximum | Unit             |
|--------------------------------------|--------------------|---------|---------|---------|------------------|
| Load voltage (AC peak/DC)            | $V_{\Delta\Delta}$ | ---     | ---     | 320     | V                |
| Operating LED forward current        | $I_\Phi$           | 5       | 7.5     | 25      | mA               |
| Continuous load current (AC peak/DC) | $I_O$              | ---     | ---     | 120     | mA               |
| Operating temperature                | $T_\alpha$         | -20     | ---     | 65      | $^\circ\text{C}$ |

# ■ Engineering Data

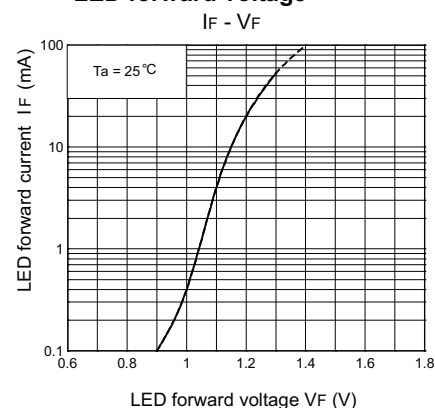
**LED forward current vs. Ambient temperature**



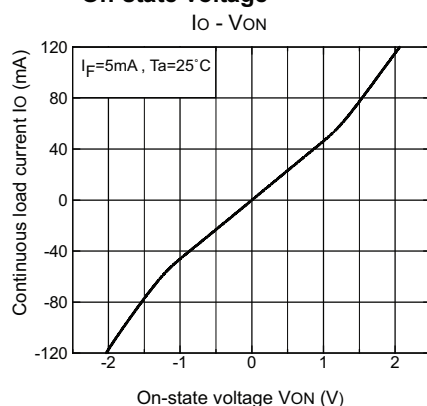
**Continuous load current vs. Ambient temperature**



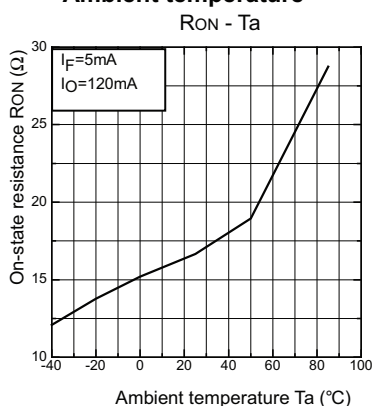
**LED forward current vs. LED forward voltage**



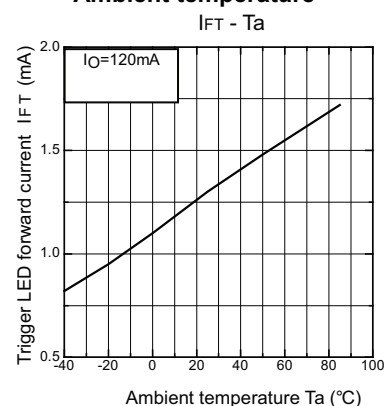
**Continuous load current vs. On-state voltage**



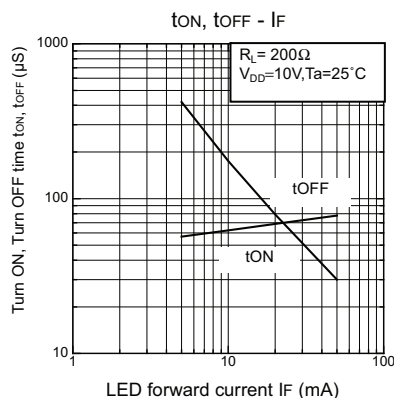
**On-state resistance vs. Ambient temperature**



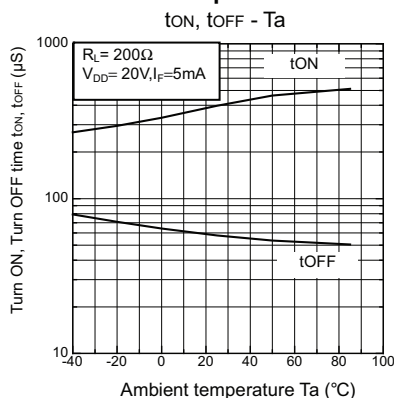
**Trigger LED forward current vs. Ambient temperature**



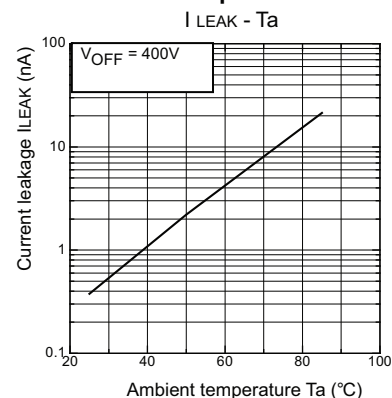
**Turn ON, Turn OFF time vs. LED forward current**



**Turn ON, Turn OFF time vs. Ambient temperature**



**Current leakage vs. Ambient temperature**



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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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