

# G3VM-41PR□/51PR

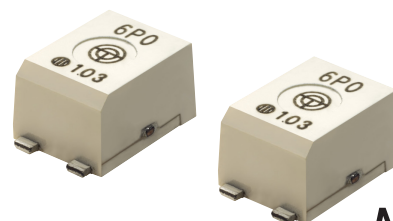
MOS FET Relays USOP package with Low Output Capacitance and ON Resistance type (Low  $C \times R$ )

## USOP Package with Low Output Capacitance and ON Resistance

• Load voltage 40V/50V

RoHS Compliant

⚠ Refer to "Common Precautions".



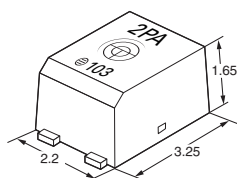
NEW

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

## Application Examples

- Semiconductor test equipment
- Communication equipment
- Test & measurement equipment
- Data loggers

## Package (Unit : mm, Average)



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

## Model Number Legend

G3VM-□□□□□  
1 2 3 4 5

### 1. Load Voltage

4: 40V  
5: 50V

### 2. Contact form

1: 1a (SPST-NO)

### 3. Package type

P: USOP 4 pin

### 4. Additional functions

R: Low On-resistance

### 5. Other informations

When specifications overlap, serial code is added in the recorded order.

## Ordering Information

| Package type | Contact form | Terminals                  | Load voltage (peak value) * | Continuous load current (peak value) * | Packing/Tape cut |                          | Packing/Tape & reel |                          |
|--------------|--------------|----------------------------|-----------------------------|----------------------------------------|------------------|--------------------------|---------------------|--------------------------|
|              |              |                            |                             |                                        | Model            | Minimum package quantity | Model               | Minimum package quantity |
| USOP4        | 1a (SPST-NO) | Surface-mounting Terminals | 40V                         | 100mA                                  | G3VM-41PR12      | 1 pc.                    | G3VM-41PR12(TR05)   | 500 pcs.                 |
|              |              |                            |                             | 120mA                                  | G3VM-41PR6       |                          | G3VM-41PR6(TR05)    |                          |
|              |              |                            |                             | 140mA                                  | G3VM-41PR10      |                          | G3VM-41PR10(TR05)   |                          |
|              |              |                            |                             | 300mA                                  | G3VM-41PR11      |                          | G3VM-41PR11(TR05)   |                          |
|              |              |                            |                             | 300mA                                  | G3VM-41PR5       |                          | G3VM-41PR5(TR05)    |                          |
|              |              |                            | 50V                         | 300mA                                  | G3VM-51PR        |                          | G3VM-51PR(TR05)     |                          |

Note: When ordering tape packing, add "(TR05)" (500pcs/reel) to the model number.  
Ask your OMRON representative for orders under 500 pcs. We can supply products with the tape already cut.  
Tape-cut USOPs are packaged without humidity resistance. Use manual soldering to mount them.  
Refer to common precautions.

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

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

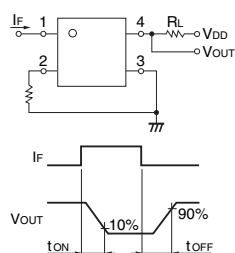
| Item                              |                                      | Symbol                      | G3VM-41PR12 | G3VM-41PR6 | G3VM-41PR10 | G3VM-41PR11 | G3VM-41PR5 | G3VM-51PR | Unit             | Measurement conditions        |
|-----------------------------------|--------------------------------------|-----------------------------|-------------|------------|-------------|-------------|------------|-----------|------------------|-------------------------------|
| Input                             | LED forward current                  | $I_F$                       | 50          |            |             |             |            |           | mA               |                               |
|                                   | LED forward current reduction rate   | $\Delta I_F/^\circ\text{C}$ | -0.5        |            |             |             |            |           | mA/°C            | $T_a \geq 25^\circ\text{C}$   |
|                                   | LED reverse voltage                  | $V_R$                       | 5           |            |             |             |            |           | V                |                               |
|                                   | Connection temperature               | $T_J$                       | 125         |            |             |             |            |           | °C               |                               |
| Output                            | Load voltage (AC peak/DC)            | $V_{OFF}$                   | 40          |            |             |             | 50         |           | V                |                               |
|                                   | Continuous load current (AC peak/DC) | $I_O$                       | 100         | 120        | 140         | 300         |            |           | mA               |                               |
|                                   | ON current reduction rate            | $\Delta I_O/^\circ\text{C}$ | -1.0        | -1.2       | -1.4        | -3          |            |           | mA/°C            | $T_a \geq 25^\circ\text{C}$   |
|                                   | Pulse ON current                     | $I_{OP}$                    | 300         | 360        | 420         | 900         |            |           | mA               | $t=100\text{ms}$ , Duty=1/10  |
|                                   | Connection temperature               | $T_J$                       | 125         |            |             |             |            |           | °C               |                               |
| Dielectric strength between I/O * |                                      | $V_{I-O}$                   | 500         |            |             |             |            |           | V <sub>rms</sub> | AC for 1 min                  |
| Ambient operating temperature     |                                      | $T_a$                       | -40~+85     |            |             |             |            |           | °C               | With no icing or condensation |
| Ambient storage temperature       |                                      | $T_{stg}$                   | -40~+125    |            |             |             |            |           | °C               |                               |
| Soldering temperature             |                                      | —                           | 260         |            |             |             |            |           | °C               | 10s                           |

\* 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.

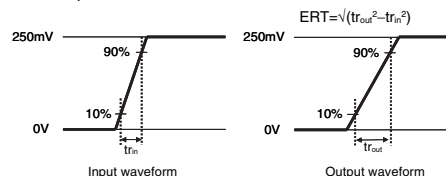
## ■Electrical Characteristics (Ta = 25°C)

| Item                                        |                                        |                   | Symbol          | G3VM-41PR12 | G3VM-41PR6 | G3VM-41PR10 | G3VM-41PR11 | G3VM-41PR5 | G3VM-51PR | Unit                                                               | Measurement conditions                                                       |
|---------------------------------------------|----------------------------------------|-------------------|-----------------|-------------|------------|-------------|-------------|------------|-----------|--------------------------------------------------------------------|------------------------------------------------------------------------------|
| Input                                       | LED forward voltage                    | V <sub>F</sub>    | Minimum         | 1.0         |            |             |             |            |           | V                                                                  | I <sub>F</sub> =10mA                                                         |
|                                             |                                        |                   | Typical         | 1.15        |            |             |             |            |           |                                                                    |                                                                              |
|                                             |                                        |                   | Maximum         | 1.3         |            |             |             |            |           |                                                                    |                                                                              |
|                                             | Reverse current                        | I <sub>R</sub>    | Maximum         | 10          |            |             |             |            |           | μA                                                                 | V <sub>R</sub> =5V                                                           |
|                                             | Capacity between terminals             | C <sub>T</sub>    | Typical         | 15          |            |             |             |            |           | pF                                                                 | V=0, f=1MHz                                                                  |
|                                             | Trigger LED forward current            | I <sub>FT</sub>   | Typical         | 1.0         | 0.6        | 0.5         | 1.0         | 0.6        | 0.5       | mA                                                                 | I <sub>o</sub> =100mA                                                        |
|                                             |                                        |                   | Maximum         | 3           |            |             |             |            |           |                                                                    |                                                                              |
| Release LED forward current                 | I <sub>FC</sub>                        | Minimum           | 0.1             |             |            |             |             |            | 0.2       | mA                                                                 | I <sub>OFF</sub> =10μA                                                       |
| Output                                      | Maximum resistance with output ON      | R <sub>ON</sub>   | Typical         | 15          | 10         | 12          | 7           | 1          |           | Ω                                                                  | I <sub>F</sub> =5mA, t<1s<br>I <sub>o</sub> =Continuous load current ratings |
|                                             |                                        |                   | Maximum         | 20          | 15         | 14          | 10          | 1.5        |           |                                                                    |                                                                              |
|                                             | Current leakage when the relay is open | I <sub>LEAK</sub> | Maximum         | 1           | 0.2        | 1           |             |            |           | nA                                                                 | V <sub>OFF</sub> =Load voltage ratings                                       |
|                                             | Capacity between terminals             | C <sub>OFF</sub>  | Typical         | 0.3         | 1          | 0.45        | 0.7         | 10         | 12        | pF                                                                 | V=0, f=100MHz, t<1s                                                          |
|                                             |                                        |                   | Maximum         | 0.6         | 2          | 0.8         | 1.3         | 14         | —         |                                                                    |                                                                              |
| Capacity between I/O terminals              |                                        | C <sub>I-O</sub>  | Typical         | 0.4         |            |             |             |            |           | pF                                                                 | f=1MHz, V <sub>S</sub> =0V                                                   |
| Insulation resistance between I/O terminals | R <sub>I-O</sub>                       | Minimum           | 1000            |             |            |             |             |            | MΩ        | V <sub>I-O</sub> =500VDC, R <sub>oH</sub> ≤60%                     |                                                                              |
|                                             |                                        | Typical           | 10 <sup>8</sup> |             |            |             |             |            |           |                                                                    |                                                                              |
| Turn-ON time                                | t <sub>ON</sub>                        | Typical           | 0.04            | 0.05        | 0.03       | 0.04        | 0.2         |            | ms        | I <sub>F</sub> =5mA, R <sub>L</sub> =200Ω, V <sub>DD</sub> =20V *1 |                                                                              |
|                                             |                                        | Maximum           | 0.2             |             |            |             | 0.5         |            |           |                                                                    |                                                                              |
| Turn-OFF time                               | t <sub>OFF</sub>                       | Typical           | 0.12            | 0.16        | 0.2        | 0.14        | 0.2         | 0.1        | ps        |                                                                    | I <sub>F</sub> =5mA, V <sub>DD</sub> =0.25V, Tr(in)=25ps *2                  |
|                                             |                                        | Maximum           | 0.2             | 0.3         |            | 0.2         | 0.3         | 0.4        |           |                                                                    |                                                                              |
| Equivalent rise time                        | ERT                                    | Typical           | —               |             |            |             |             |            | 40        | ps                                                                 |                                                                              |
|                                             |                                        | Maximum           | —               |             |            |             |             |            | 90        |                                                                    |                                                                              |

\*1. Turn-ON and Turn-OFF Times



\*2. Equivalent Rise Time



## ■Recommended Operating Conditions

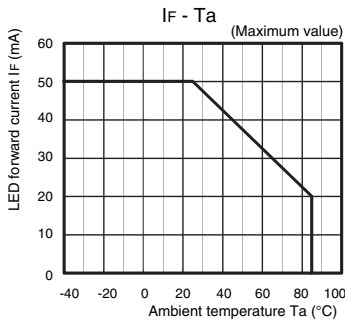
For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics.

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

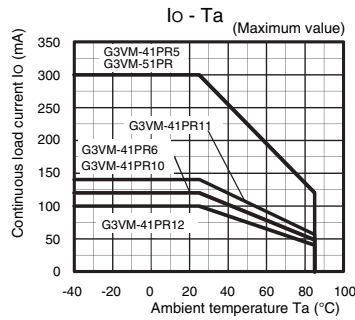
| Item                                 | Symbol          |         | G3VM-41PR12 | G3VM-41PR6 | G3VM-41PR10 | G3VM-41PR11 | G3VM-41PR5 | G3VM-51PR | Unit |   |
|--------------------------------------|-----------------|---------|-------------|------------|-------------|-------------|------------|-----------|------|---|
| Load voltage (AC peak/DC)            | V <sub>DD</sub> | Maximum | 32          |            |             |             |            |           | 40   | V |
| Operating LED forward current        | I <sub>F</sub>  | Minimum | 5           |            |             |             |            |           | mA   |   |
|                                      |                 | Typical | 7.5         |            |             |             |            |           |      |   |
|                                      |                 | Maximum | 20          |            |             |             |            |           |      |   |
| Continuous load current (AC peak/DC) | I <sub>O</sub>  | Maximum | 100         | 120        |             | 140         | 300        |           |      |   |
| Ambient operating temperature        | T <sub>a</sub>  | Minimum | −20         |            |             |             |            |           | °C   |   |
|                                      |                 | Maximum | 65          |            |             |             |            |           |      |   |

## Engineering Data

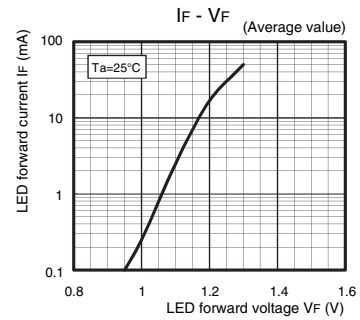
### LED forward current vs. Ambient temperature



### Continuous load current vs. Ambient temperature

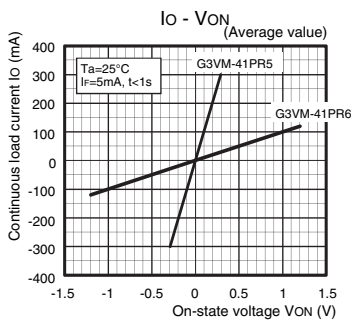


### LED forward current vs. LED forward voltage

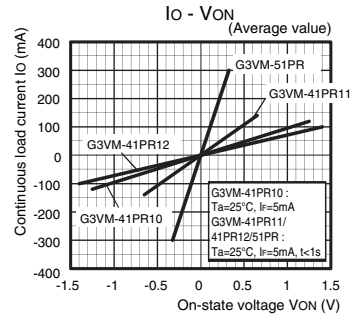


### Continuous load current vs. On-state voltage

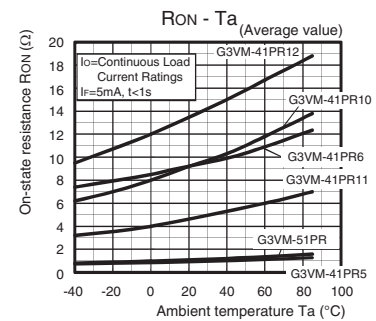
G3VM-41PR5/41PR6



G3VM-41PR10/41PR11/41PR12/51PR

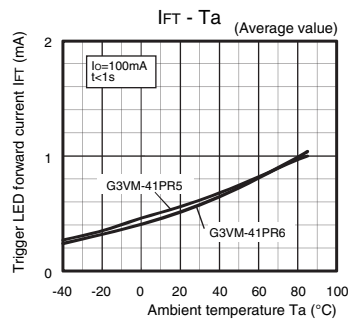


### On-state resistance vs. Ambient temperature

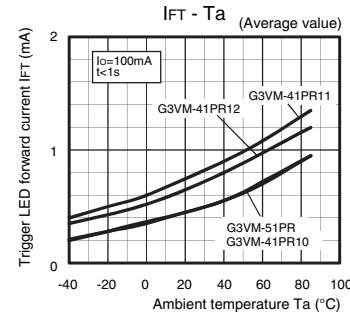


### Trigger LED forward current vs. Ambient temperature

G3VM-41PR5/41PR6

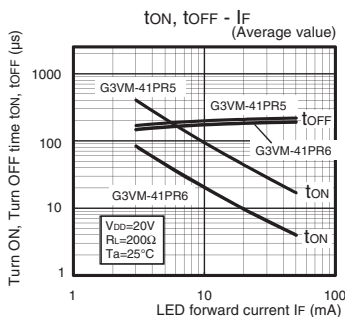


G3VM-41PR10/41PR11/41PR12/51PR

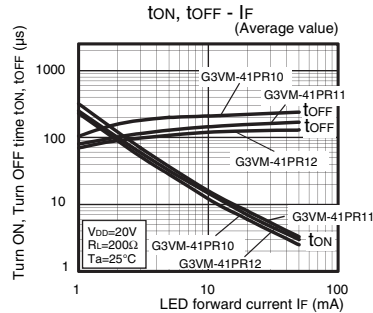


### Turn ON, Turn OFF time vs. LED forward current

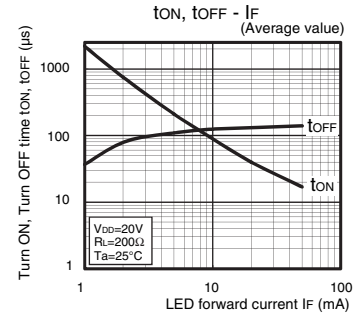
G3VM-41PR5/41PR6



G3VM-41PR10/41PR11/41PR12

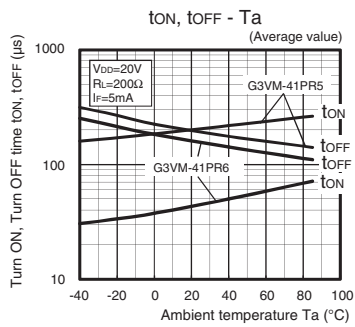


G3VM-51PR

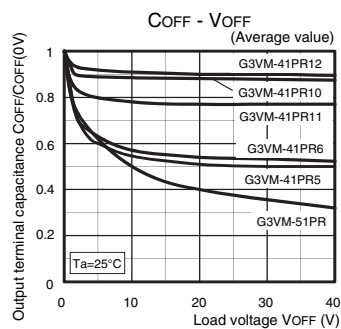


### Engineering Data

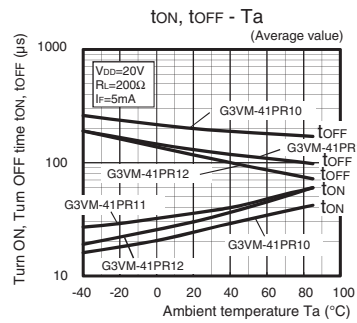
#### ● Turn ON, Turn OFF time vs. Ambient temperature G3VM-41PR5/41PR6



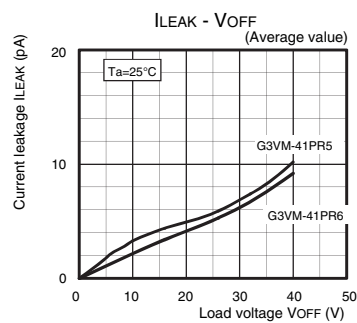
#### ● Output terminal capacitance vs. Load voltage



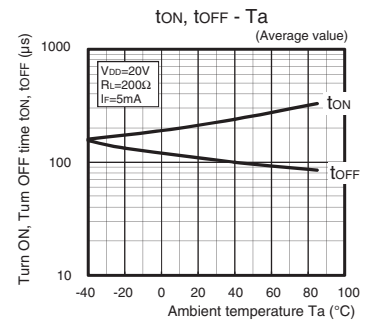
#### G3VM-41PR10/41PR11/41PR12



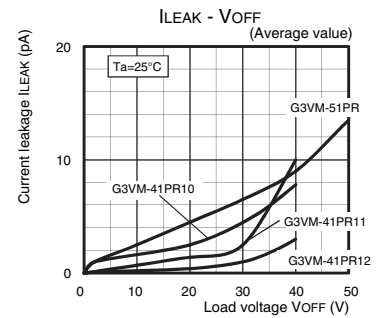
#### ● Current leakage vs. Load voltage G3VM-41PR5/41PR6



#### G3VM-51PR



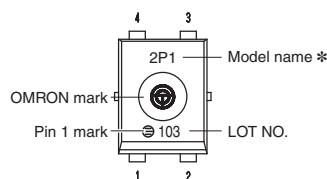
#### G3VM-41PR10/41PR11/41PR12/51PR



## ■Appearance / Terminal Arrangement / Internal Connections

### ■Appearance

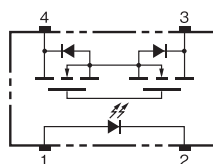
USOP (Ultra Small Outline Package)  
USOP4 pin



\* Actual model name marking for each model

| Model       | Marking |
|-------------|---------|
| G3VM-41PR12 | 4PC     |
| G3VM-41PR6  | 4P6     |
| G3VM-41PR10 | 4PA     |
| G3VM-41PR11 | 4PB     |
| G3VM-41PR5  | 4P5     |
| G3VM-51PR   | 5P0     |

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

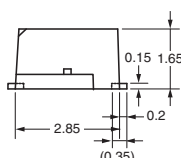
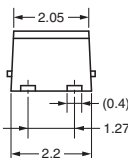
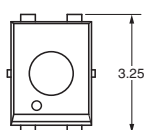
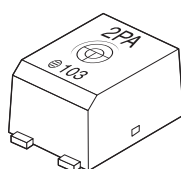


**Note.** The actual product is marked differently from the image shown here.

## ■Dimensions (Unit: mm)

### Surface-mounting Terminals

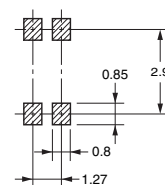
Weight: 0.03g



Unless otherwise specified, the dimensional tolerance is  $\pm 0.2$  mm.

### Actual Mounting Pad Dimensions

(Recommended Value, Top View)



Unless otherwise specified, the dimensional tolerance is  $\pm 0.2$  mm.

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

## ■Approved Standards

UL recognized

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

## ■Safety Precautions

- Refer to "Common Precautions" for all G3VM models.

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

## OMRON Corporation

Electronic and Mechanical Components Company

### Regional Contact

#### Americas

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

#### Asia-Pacific

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#### Korea

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#### Europe

<http://components.omron.eu/>

#### China

<https://www.ecb.omron.com.cn/>

#### Japan

<https://www.omron.co.jp/ecb/>