

# MOS FET Relays

## G3VM-21LR1

**World's Smallest SSOP Package MOS FET Relay\* with Low Output Capacitance and ON Resistance ( $C \times R = 4\text{pF} \cdot \Omega$ ) in a 20-V Load Voltage Model**

- ON resistance of  $0.8 \Omega$  (typical) suppresses output signal attenuation.
- RoHS Compliant.

\*Information correct as of May, 2007, according to data obtained by OMRON.

### Application Examples

- Semiconductor inspection tools
- Measurement devices and Data loggers
- Broadband systems



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

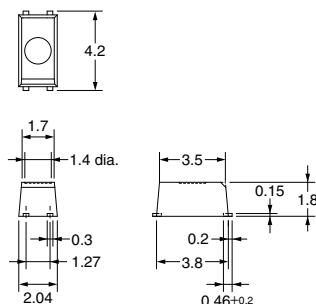
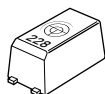
### List of Models

| Contact form | Terminals                  | Load voltage (peak value) | Model            | Number per tape |
|--------------|----------------------------|---------------------------|------------------|-----------------|
| SPST-NO      | Surface-mounting terminals | 20 VAC                    | G3VM-21LR1       | ---             |
|              |                            |                           | G3VM-21LR1(TR)   | 1,500           |
|              |                            |                           | G3VM-21LR1(TR05) | 500             |
|              |                            |                           | G3VM-21LR1(TR10) | 1,000           |

### Dimensions

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

#### G3VM-21LR1



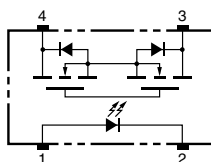
**Note:** The actual product is marked differently from the image shown here.

**Note:** A tolerance of  $\pm 0.1$  mm applies to all dimensions unless otherwise specified.

Weight: 0.03 g

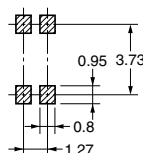
### Terminal Arrangement/Internal Connections (Top View)

#### G3VM-21LR1



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

#### G3VM-21LR1



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

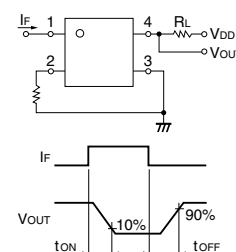
| Item                                                       | Symbol                              | Rating                         | Unit        | Measurement conditions |
|------------------------------------------------------------|-------------------------------------|--------------------------------|-------------|------------------------|
| 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                                                     | Load voltage (AC peak/DC)           | $V_{OFF}$                      | 20          | V                      |
|                                                            | Continuous load current             | $I_O$                          | 450         | mA                     |
|                                                            | ON current reduction rate           | $\Delta I_{ON}/^\circ\text{C}$ | -4.5        | mA/°C                  |
|                                                            | Connection temperature              | $T_J$                          | 125         | °C                     |
| Dielectric strength between input and output (See note 1.) |                                     | $V_{I-O}$                      | 1,500       | $V_{rms}$              |
| Operating temperature                                      |                                     | $T_a$                          | -20 to +85  | °C                     |
| Storage temperature                                        |                                     | $T_{slg}$                      | -40 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   | $\mu\text{A}$          |
|                                | Capacity between terminals             | $C_T$      | ---     | 15      | ---  | pF                     |
|                                | Trigger LED forward current            | $I_{FT}$   | ---     | ---     | 4    | mA                     |
| Output                         | Maximum resistance with output ON      | $R_{ON}$   | ---     | 0.8     | 1.2  | $\Omega$               |
|                                | Current leakage when the relay is open | $I_{LEAK}$ | ---     | 0.2     | 1.0  | nA                     |
|                                | Capacity between terminals             | $C_{OFF}$  | ---     | 5.0     | 12.0 | pF                     |
| Capacity between I/O terminals |                                        | $C_{I-O}$  | ---     | 0.8     | ---  | pF                     |
| Insulation resistance          |                                        | $R_{I-O}$  | 1,000   | ---     | ---  | M $\Omega$             |
| Turn-ON time                   |                                        | $t_{ON}$   | ---     | 0.2     | 0.5  | ms                     |
| Turn-OFF time                  |                                        | $t_{OFF}$  | ---     | 0.2     | 0.5  | ms                     |

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



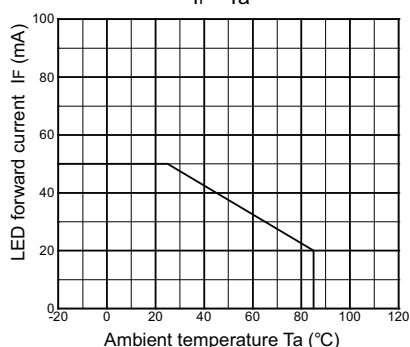
# ■ Recommended Operating Conditions

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

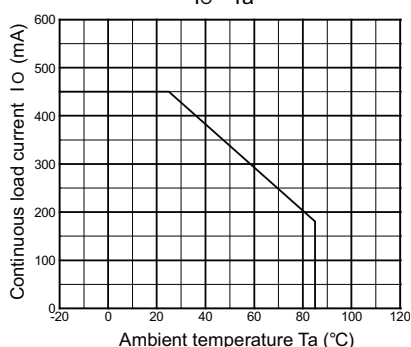
| Item                                 | Symbol   | Minimum | Typical | Maximum | Unit |
|--------------------------------------|----------|---------|---------|---------|------|
| Load voltage (AC peak/DC)            | $V_{DD}$ | ---     | ---     | 20      | V    |
| Operating LED forward current        | $I_F$    | 10      | ---     | 30      | mA   |
| Continuous load current (AC peak/DC) | $I_O$    | ---     | ---     | 450     | mA   |
| Operating temperature                | $T_a$    | 25      | ---     | 60      | °C   |

# ■ Engineering Data

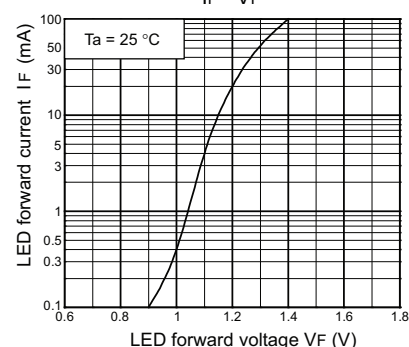
**LED forward current vs.  
Ambient temperature**  
 $I_F - T_a$



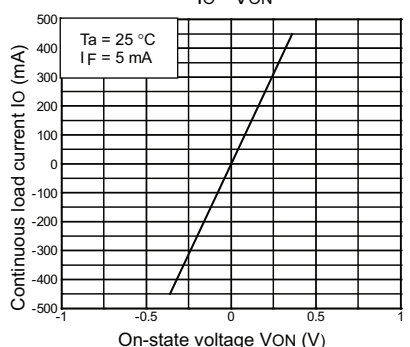
**Continuous load current vs.  
Ambient temperature**  
 $I_O - T_a$



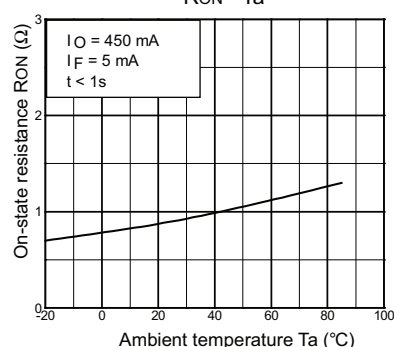
**LED forward current vs.  
LED forward voltage**  
 $I_F - V_F$



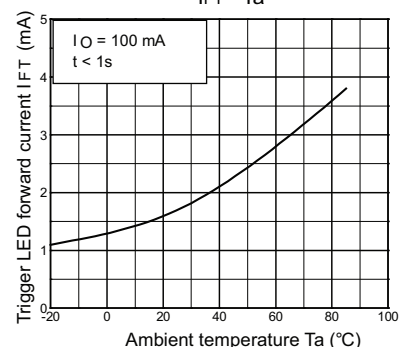
**Continuous load current vs.  
On-state voltage**  
 $I_O - V_{ON}$



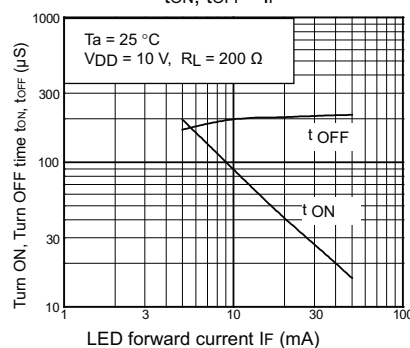
**On-state resistance vs.  
Ambient temperature**  
 $R_{ON} - T_a$



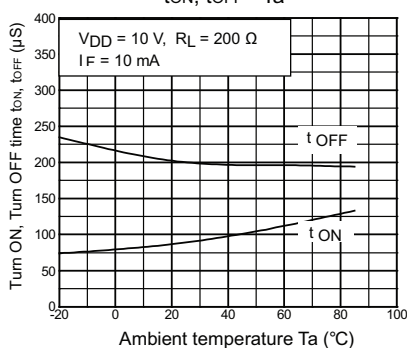
**Trigger LED forward current vs.  
Ambient temperature**  
 $I_{FT} - T_a$



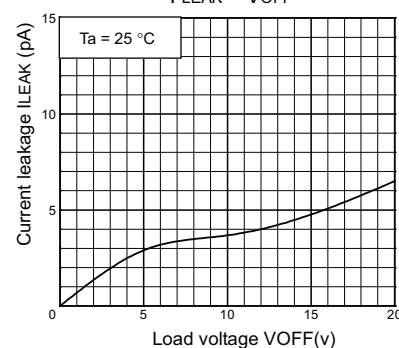
**Turn ON, Turn OFF time vs.  
LED forward current**  
 $t_{ON}, t_{OFF} - I_F$



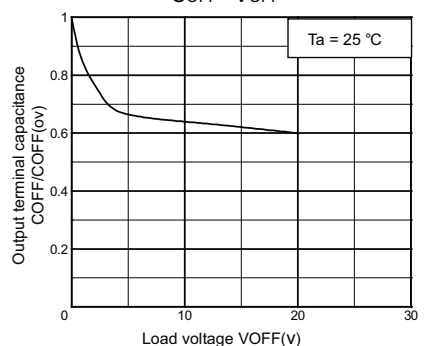
**Turn ON, Turn OFF time vs.  
Ambient temperature**  
 $t_{ON}, t_{OFF} - T_a$



**Current leakage vs.  
Load voltage**  
 $I_{LEAK} - V_{OFF}$



**Output terminal capacitance  
COFF/COFF(ov) vs. Load voltage**  
 $COFF - V_{OFF}$



# MEMO

# Omron Electronic Components, LLC

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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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