

# G3VM-21LR1

MOS FET Relays

## World's Smallest\* SSOP Package MOS FET Relays with Low Output Capacitance and ON Resistance ( $C \times R = 5 \text{ pF} \cdot \Omega$ ) in a 20-V Load Voltage Model.

• ON resistance of  $1 \Omega$  (typical) suppresses output signal attenuation.

\* As of August 2014 Survey by OMRON



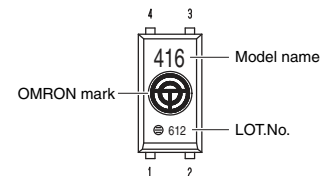
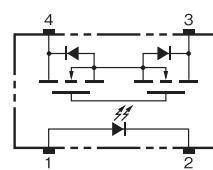
Note: The actual product is marked differently from the image shown here.

RoHS compliant

### Application Examples

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

### Terminal Arrangement/Internal Connections



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

### List of Models

Package type	Contact form	Terminals	Load voltage (peak value) *	Model	Minimum package quantity
SSOP4	1a (SPST-NO)	Surface-mounting Terminals	20 V	G3VM-21LR1	-
				G3VM-21LR1 (TR05)	500

Note: Ask your OMRON representative for orders under 500 pcs. We can supply products with the tape already cut.

Tape-cut SSOPs 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.

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

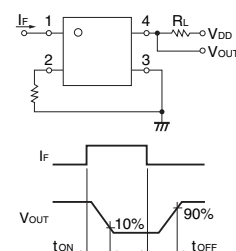
Item	Symbol	Rating	Unit	Measurement conditions	
Input	LED forward current	$I_F$	50	mA	
	LED forward current reduction rate	$\Delta I_F / ^\circ\text{C}$	-0.5	mA/ $^\circ\text{C}$	$T_a \geq 25 \text{ }^\circ\text{C}$
	LED reverse voltage	$V_R$	5	V	
	Connection temperature	$T_J$	125	$^\circ\text{C}$	
Output	Load voltage (AC peak/DC)	$V_{OFF}$	20	V	
	Continuous load current (AC peak/DC)	$I_o$	450	mA	
	ON current reduction rate	$\Delta I_o / ^\circ\text{C}$	-4.5	mA/ $^\circ\text{C}$	$T_a \geq 25 \text{ }^\circ\text{C}$
	Pulse ON current	$I_{op}$	1.35	A	$t = 100 \text{ ms}$ , Duty = 1/10
Connection temperature	$T_J$	125	$^\circ\text{C}$		
Dielectric strength between I/O (See note 1.)	$V_{I-O}$	1500	V <sub>rms</sub>	AC for 1 min	
Ambient operating temperature	$T_a$	-20 to +85	$^\circ\text{C}$	With no icing or condensation	
Ambient storage temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$	With no icing or condensation	
Soldering temperature	-	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 ( $T_a = 25 \text{ }^\circ\text{C}$ )

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	$\mu\text{A}$	$V_R = 5 \text{ V}$
	Capacity between terminals	$C_T$	-	15	-	pF	$V = 0$ , $f = 1 \text{ MHz}$
	Trigger LED forward current	$I_{FT}$	-	-	4	mA	$I_o = 100 \text{ mA}$
	Turn-OFF LED forward current	$I_{FC}$	0.2	-	-	mA	$I_{OFF} = 10 \mu\text{A}$
Output	Maximum resistance with output ON	$R_{ON}$	-	0.8	1.2	$\Omega$	$I_F = 5 \text{ mA}$ , $I_o = 450 \text{ mA}$ , $t = 10 \text{ ms}$
	Current leakage when the relay is open	$I_{LEAK}$	-	-	1.0	nA	$V_{OFF} = 20 \text{ V}$ , $T_a = 50 \text{ }^\circ\text{C}$
	Capacity between terminals	$C_{OFF}$	-	5	12	pF	$V = 0$ , $f = 100 \text{ MHz}$ , $t < 1 \text{ s}$
	Capacity between I/O terminals	$C_{I-O}$	-	0.8	-	pF	$f = 1 \text{ MHz}$ , $V_s = 0 \text{ V}$
	Insulation resistance between I/O terminals	$R_{I-O}$	1000	$10^8$	-	M $\Omega$	$V_{I-O} = 500 \text{ VDC}$ , $R_oH \leq 60 \%$
	Turn-ON time	$t_{ON}$	-	0.2	0.5	ms	$I_F = 5 \text{ mA}$ , $R_L = 200 \Omega$ , $V_{DD} = 10 \text{ V}$ (See note 2.)
	Turn-OFF time	$t_{OFF}$	-	0.2	0.5	ms	

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



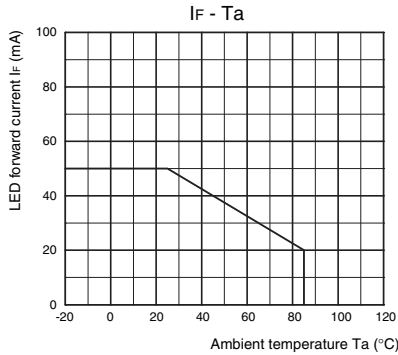
## Recommended Operating Conditions

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

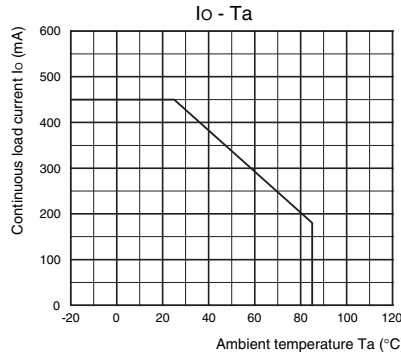
Item	Symbol	Minimum	Typical	Maximum	Unit
Load voltage (AC peak/DC)	$V_{DD}$	-	-	20	V
Operating LED forward current	$I_F$	10	-	30	mA
Continuous load current (AC peak/DC)	$I_O$	-	-	450	mA
Ambient operating temperature	$T_a$	-20	-	60	°C

## Engineering Data

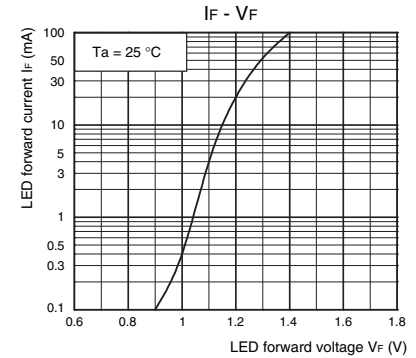
LED forward current vs. Ambient temperature



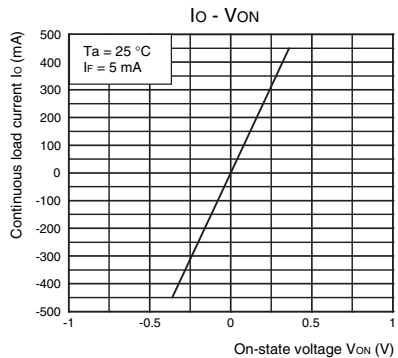
Continuous load current vs. Ambient temperature



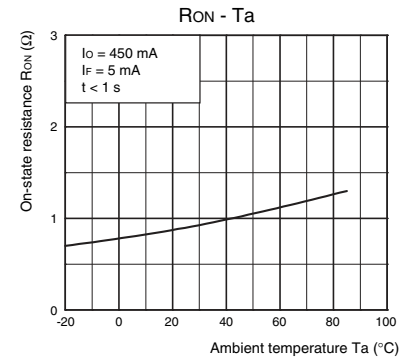
LED forward current vs. LED forward voltage



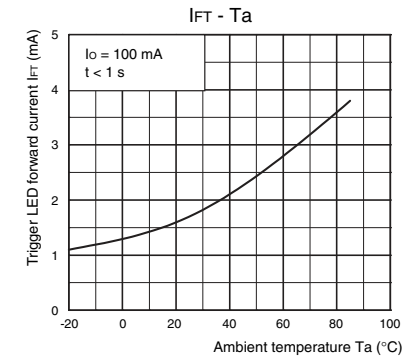
Continuous load current vs. On-state voltage



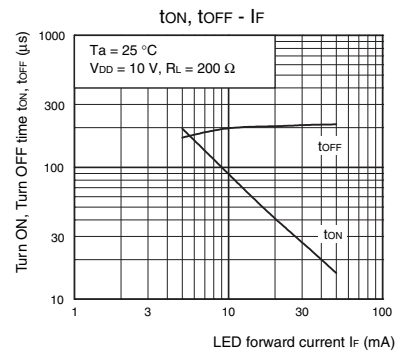
On-state resistance vs. Ambient temperature



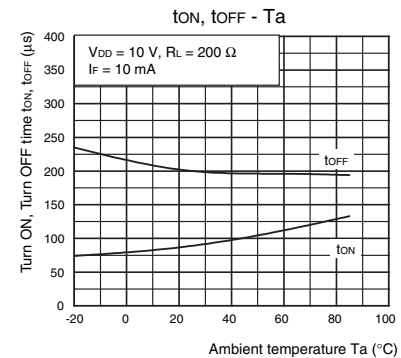
Trigger LED forward current vs. Ambient temperature



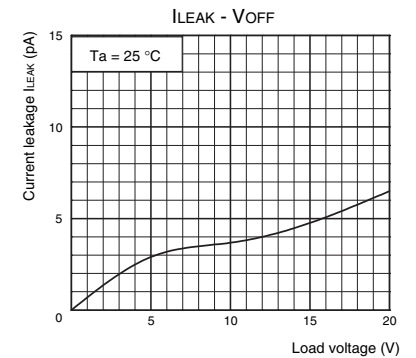
Turn ON, Turn OFF time vs. LED forward current



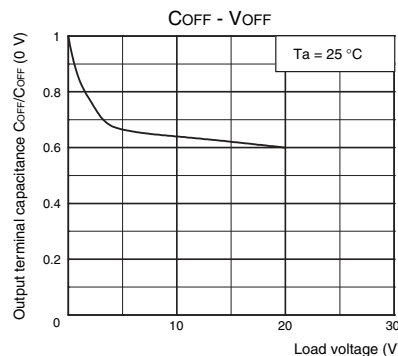
Turn ON, Turn OFF time vs. Ambient temperature



Current leakage vs. Load voltage



Output terminal capacitance vs. Load voltage

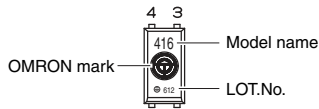


## Safety Precautions

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

## ■ Appearance

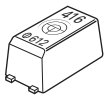
SSOP (Shrink Small Outline Package)  
SSOP4



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

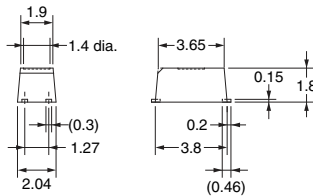
## ■ Dimensions

(Unit: mm)



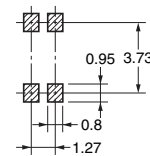
### Surface-mounting Terminals

Weight: 0.03 g



### Actual Mounting Pad Dimensions

(Recommended Value, TOP VIEW)



Unless otherwise specified, the dimensional tolerance is  $\pm 0.1$  mm.

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

- Application examples provided in this document are for reference only. In actual applications, confirm equipment functions and safety before using the product.
- Consult your OMRON representative before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems or equipment that may have a serious influence on lives and property if used improperly. Make sure that the ratings and performance characteristics of the product provide a margin of safety for the system or equipment, and be sure to provide the system or equipment with double safety mechanisms.

Note: Do not use this document to operate the Unit.