

# G3VM-41LR□

MOS FET Relays SSOP, Low-output-capacitance and Low-ON-resistance Type (with Low  $C \times R$ )

## MOS FET Relays in SSOP packages that achieve a low $C \times R$

- Load voltage : 40 V
- G3VM-41LR10 : Low  $C \times R = 5.4 \text{ pF} \cdot \Omega$ ,  $C_{\text{OFF}}$  (standard) = 0.45 pF,  $R_{\text{ON}}$  (standard) = 12  $\Omega$
- G3VM-41LR6 : Low  $C \times R = 10 \text{ pF} \cdot \Omega$ ,  $C_{\text{OFF}}$  (standard) = 1 pF,  $R_{\text{ON}}$  (standard) = 10  $\Omega$
- G3VM-41LR11 : Low  $C \times R = 4.9 \text{ pF} \cdot \Omega$ ,  $C_{\text{OFF}}$  (standard) = 0.7 pF,  $R_{\text{ON}}$  (standard) = 7  $\Omega$
- G3VM-41LR4 : Low  $C \times R = 10 \text{ pF} \cdot \Omega$ ,  $C_{\text{OFF}}$  (standard) = 5 pF,  $R_{\text{ON}}$  (standard) = 2  $\Omega$
- G3VM-41LR5 : Low  $C \times R = 10 \text{ pF} \cdot \Omega$ ,  $C_{\text{OFF}}$  (standard) = 10 pF,  $R_{\text{ON}}$  (standard) = 1  $\Omega$



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

RoHS Compliant

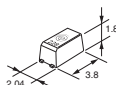
### Application Examples

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

### Package

(Unit : mm, Average)

SSOP 4-pin



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

### Model Number Legend

G3VM-□□□□□  
1 2 3 4 5

1. Load Voltage    2. Contact form    3. Package  
4 : 40 V                    1 : 1a (SPST-NO)    L : SSOP 4-pin

4. Additional functions    5. Other informations

R: Low ON resistance    When specifications overlap, serial code is added in the recorded order.

### Ordering Information

Package	Contact form	Terminals	Load voltage (peak value) *	Continuous load current (peak value) *	Tape cut packaging		Tape packaging	
					Model	Minimum package quantity	Model	Minimum package quantity
SSOP4	1a (SPST-NO)	Surface-mounting Terminals	40 V	120 mA	G3VM-41LR10	1 pc.	G3VM-41LR10(TR05)	500 pcs.
				140 mA	G3VM-41LR6		G3VM-41LR6(TR05)	
				250 mA	G3VM-41LR11		G3VM-41LR11(TR05)	
				300 mA	G3VM-41LR4		G3VM-41LR4(TR05)	
					G3VM-41LR5		G3VM-41LR5(TR05)	

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

Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR05)" to the end of the model number.

Tape-cut SSOPs are packaged without humidity resistance. Use manual soldering to mount them. Refer to common precautions.

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

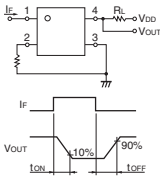
Item	Symbol	G3VM-41LR10	G3VM-41LR6	G3VM-41LR11	G3VM-41LR4	G3VM-41LR5	Unit	Measurement conditions
LED forward current	If	30	50	30	50		mA	
LED forward current reduction rate	$\Delta I_f / ^\circ\text{C}$	-0.3	-0.5	-0.3	-0.5		$\text{mA}/^\circ\text{C}$	Ta $\geq 25^\circ\text{C}$
LED reverse voltage	Vr	5					V	
Connection temperature	Tj	125					$^\circ\text{C}$	
Load voltage (AC peak/DC)	Voff	40					V	
Continuous load current (AC peak/DC)	Io	120		140	250	300	mA	
ON current reduction rate	$\Delta I_o / ^\circ\text{C}$	-1.2		-1.4	-2.5	-3.0	$\text{mA}/^\circ\text{C}$	Ta $\geq 25^\circ\text{C}$
Pulse ON current	Iop	360		420	750	900	mA	t = 100 ms, Duty = 1/10
Connection temperature	Tj	125					$^\circ\text{C}$	
Dielectric strength between I/O (See note 1.)	V <sub>i-o</sub>	1500					Vrms	AC for 1 min
Ambient operating temperature	Ta	-20 to +85					$^\circ\text{C}$	With no icing or condensation
Ambient storage temperature	Tstg	-40 to +125					$^\circ\text{C}$	
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 (Ta = 25°C)

Item	Symbol		G3VM-41LR10	G3VM-41LR6	G3VM-41LR11	G3VM-41LR4	G3VM-41LR5	Unit	Measurement conditions
LED forward voltage	V <sub>F</sub>	Minimum	1.15	1.0	1.15	1.0		V	G3VM-41LR4/41LR5/41LR6 : I <sub>F</sub> =10 mA G3VM-41LR10/41LR11 : I <sub>F</sub> =5 mA
		Typical	1.35	1.15	1.3	1.15			
		Maximum	1.45	1.3	1.45	1.3			
Reverse current	I <sub>R</sub>	Maximum	10					μA	V <sub>R</sub> =5 V
Capacitance between terminals	C <sub>T</sub>	Typical	70	15	70	15		pF	V=0, f=1 MHz
Trigger LED forward current	I <sub>FT</sub>	Maximum	3	4	3	4		mA	I <sub>O</sub> =100 mA
Release LED forward current	I <sub>FC</sub>	Minimum	0.1	0.2	0.1	0.2		mA	G3VM-41LR4/41LR5/41LR6/41LR10 : I <sub>OFF</sub> =10 μA G3VM-41LR11 : I <sub>OFF</sub> =1 μA
Maximum resistance with output ON	R <sub>ON</sub>	Typical	12	10	7	2	1	Ω	G3VM-41LR4/41LR6 : I <sub>F</sub> =5 mA, I <sub>O</sub> =Continuous load current ratings, t=10 ms G3VM-41LR5/41LR10/41LR11 : I <sub>F</sub> =5 mA, I <sub>O</sub> =Continuous load current ratings, t<1 s
		Maximum	14	15	10	3	1.5		
Current leakage when the relay is open	I <sub>LEAK</sub>	Typical	0.01	–	0.01	–		nA	G3VM-41LR4/41LR5/41LR6: V <sub>OFF</sub> =30 V, Ta=50°C G3VM-41LR10/41LR11 : V <sub>OFF</sub> =35 V
		Maximum	0.2	1	0.2	1			
Capacitance between terminals	C <sub>OFF</sub>	Typical	0.45	1	0.7	5	10	pF	V=0, f=100 MHz, t<1 s
		Maximum	0.8	2	1.3	7	14		
Capacitance between I/O terminals	C <sub>I-O</sub>	Typical	0.3	0.8	0.3	0.8		pF	f=1 MHz, V <sub>S</sub> =0 V
Insulation resistance between I/O terminals	R <sub>I-O</sub>	Minimum	1000					MΩ	V <sub>I-O</sub> =500 VDC, R <sub>oH</sub> ≤60%
		Typical	10 <sup>8</sup>						
Turn-ON time	t <sub>ON</sub>	Typical	–	0.05	–	0.12	0.2	ms	I <sub>F</sub> =5 mA, R <sub>L</sub> =200 Ω, V <sub>DD</sub> =10 V (See note 2.)
		Maximum	0.2	0.5	0.2	0.5			
Turn-OFF time	t <sub>OFF</sub>	Typical	–	0.12	–	0.14	0.2	ms	I <sub>F</sub> =5 mA, R <sub>L</sub> =200 Ω, V <sub>DD</sub> =10 V (See note 2.)
		Maximum	0.3	0.5	0.2	0.5			

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



### 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.

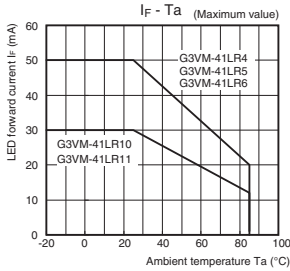
Item	Symbol		G3VM-41LR10	G3VM-41LR6	G3VM-41LR11	G3VM-41LR4	G3VM-41LR5	Unit
Load voltage (AC peak/DC)	V <sub>DD</sub>	Maximum	32					V
		Minimum	–	10	–	10		
Operating LED forward current	I <sub>F</sub>	Maximum	20	30	20	30		mA
		Maximum	120		140	250	300	
Continuous load current (AC peak/DC)	I <sub>O</sub>	Maximum	120		140	250	300	mA
		Minimum	-20					
Ambient operating temperature	T <sub>a</sub>	Minimum	-20					°C
		Maximum	60					

### Spacing and Insulation

Item	Minimum	Unit
Creepage distances	2.5	mm
Clearance distances	2.5	
Internal isolation thickness	0.1	

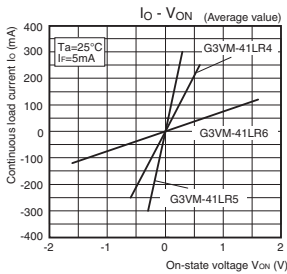
## ■ Engineering Data

### ● LED forward current vs. Ambient temperature

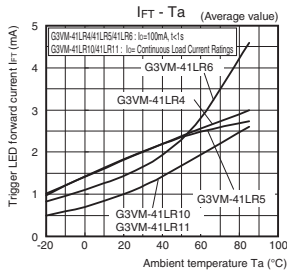


### ● Continuous load current vs. On-state voltage

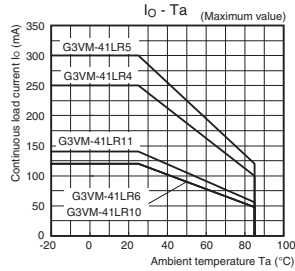
G3VM-41LR6/41LR4/41LR5



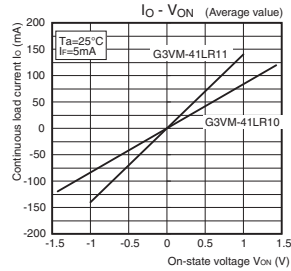
### ● Trigger LED forward current vs. Ambient temperature



### ● Continuous load current vs. Ambient temperature

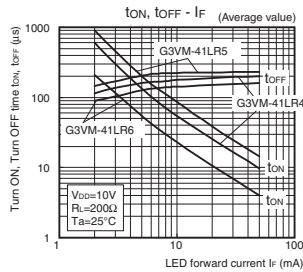


### G3VM-41LR10/41LR11

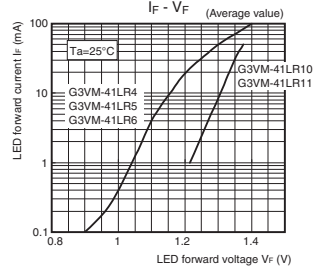


### ● Turn ON, Turn OFF time vs. LED forward current

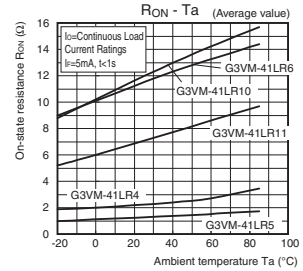
G3VM-41LR6/41LR4/41LR5



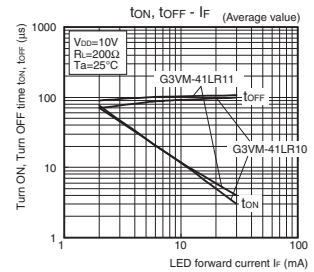
### ● LED forward current vs. LED forward voltage



### ● On-state resistance vs. Ambient temperature

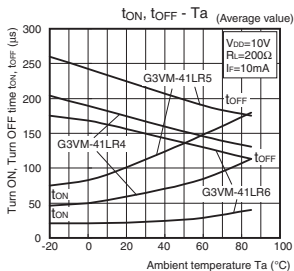


### G3VM-41LR10/41LR11

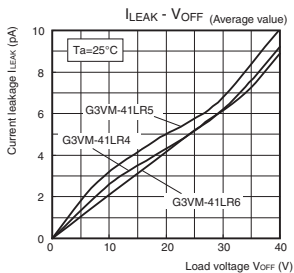


### Engineering Data

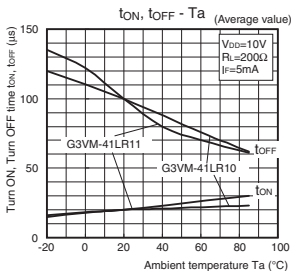
#### Turn ON, Turn OFF time vs. Ambient temperature G3VM-41LR6/41LR4/41LR5



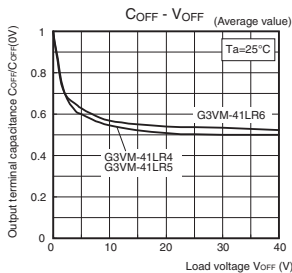
#### Current leakage vs. Load voltage G3VM-41LR6/41LR4/41LR5



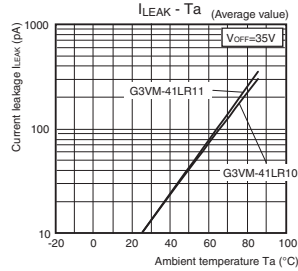
#### G3VM-41LR10/41LR11



#### Output terminal capacitance vs. Load voltage G3VM-41LR6/41LR4/41LR5



#### Current leakage vs. Ambient temperature G3VM-41LR10/41LR11



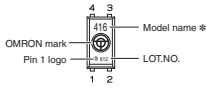
Introduction  
 General purpose  
 High-side-voltage  
 Multi-contact pair (2a, 2b, and 1a1)  
 High-current and high-on-resistance  
 Small and high-dielectric-strength  
 High-dielectric-strength  
 Current-limiting  
 Low-voltage-capacitance and low-on-resistance  
 Small and High-side-voltage  
 Certified models with standard derivation  
 DIP  
 SOP  
**SSOP**  
 USOP  
 VSON  
 G3VM-41LR□

## ■ Appearance / Terminal Arrangement / Internal Connections

### ● Appearance

#### SSOP (Shrink Small Outline Package)

SSOP 4-pin



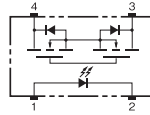
**Note:** 1. The actual product is marked differently from the image shown here.

**Note:** 2. "G3VM" does not appear in the model number on the Relay.

\* Actual model name marking for each model

Model	Marking
G3VM-41LR10	41A
G3VM-41LR6	41B
G3VM-41LR11	41B
G3VM-41LR4	41A
G3VM-41LR5	41S

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

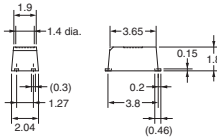


## ■ Dimensions (Unit: mm)



### Surface-mounting Terminals

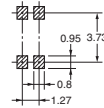
Weight: 0.03 g



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

### Actual Mounting Pad Dimensions

(Recommended Value, TOP VIEW)



**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 (SPST-NO)	E80555

## ■ Safety Precautions

- Refer to the *Common Precautions for All MOS FET Relays* for precautions that apply to all MOS FET Relays.