

# G3VM-21GR□/41GR4/41GR5/41GR6/81GR□

MOS FET Relays SOP 4-pin, Low-output-capacitance and Low-ON-resistance Type (with Low C × R)

## MOS FET Relays in SOP 4-pin packages that achieve a low C × R

- Load voltage: 20 V, 40 V, or 80 V
- G3VM-21GR: Low C × R = 5 pF·Ω, C<sub>OFF</sub> (standard) = 1 pF, R<sub>ON</sub> (standard) = 5 Ω
- G3VM-21GR1: Low C × R = 5 pF·Ω, C<sub>OFF</sub> (standard) = 5 pF, R<sub>ON</sub> (standard) = 1 Ω
- G3VM-41GR6: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 1 pF, R<sub>ON</sub> (standard) = 10 Ω
- G3VM-41GR4: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 5 pF, R<sub>ON</sub> (standard) = 2 Ω
- G3VM-41GR5: Low C × R = 10 pF·Ω, C<sub>OFF</sub> (standard) = 10 pF, R<sub>ON</sub> (standard) = 1 Ω



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



RoHS Compliant

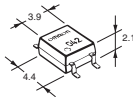
### Application Examples

- Semiconductor test equipment
- Security equipment
- Amusement equipment
- Test & Measurement equipment
- Industrial equipment
- Communication equipment
- Power circuit

### Package

(Unit : mm, Average)

SOP 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: 20 V  
4: 40 V  
8: 80 V
2. Contact form  
1: 1a (SPST-NO)
4. Additional functions  
R: Low ON resistance

3. Package  
G : SOP 4-pin
5. Other informations

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) *	Stick packaging		Tape packaging	
					Model	Minimum package quantity	Model	Minimum package quantity
SOP4	1a (SPST-NO)	Surface-mounting Terminals	20 V	160 mA	G3VM-21GR	100 pcs.	G3VM-21GR(TR)	2,500 pcs.
				300 mA	G3VM-21GR1		G3VM-21GR1(TR)	
			40 V	120 mA	G3VM-41GR6		G3VM-41GR6(TR)	
				250 mA	G3VM-41GR4		G3VM-41GR4(TR)	
			80 V	300 mA	G3VM-41GR5		G3VM-41GR5(TR)	
				40 mA	G3VM-81GR		G3VM-81GR(TR)	
200 mA	G3VM-81GR1	G3VM-81GR1(TR)						

\* 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 "(TR)" to the end of the model number.

### Absolute Maximum Ratings (T<sub>a</sub> = 25°C)

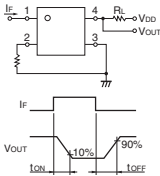
Item	Symbol	G3VM-21GR	G3VM-21GR1	G3VM-41GR6	G3VM-41GR4	G3VM-41GR5	G3VM-81GR	G3VM-81GR1	Unit	Measurement conditions	
LED forward current	I <sub>F</sub>	50								mA	
LED forward current reduction rate	ΔI <sub>F</sub> /°C	-0.5								mA/°C	T <sub>a</sub> ≥ 25°C
LED reverse voltage	V <sub>R</sub>	5								V	
Connection temperature	T <sub>J</sub>	125								°C	
Load voltage (AC peak/DC)	V <sub>OFF</sub>	20		40		80				V	
Continuous load current (AC peak/DC)	I <sub>O</sub>	160	300	120	250	300	40	200	mA		
ON current reduction rate	ΔI <sub>O</sub> /°C	-1.6	-3.0	-1.2	-2.5	-3.0	-0.4	-2.0	mA/°C	T <sub>a</sub> ≥ 25°C	
Pulse ON current	I <sub>OP</sub>	480	900	360	750	900	120	600	mA	t = 100 ms, Duty = 1/10	
Connection temperature	T <sub>J</sub>	125								°C	
Dielectric strength between I/O (See note 1.)	V <sub>I/O</sub>	1500								Vrms	AC for 1 min
Ambient operating temperature	T <sub>a</sub>	-20 to +85								°C	
Ambient storage temperature	T <sub>stg</sub>	-40 to +125		-55 to +125		-40 to +125				°C	With no icing or condensation
Soldering temperature	-	260								°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-21GR	G3VM-21GR1	G3VM-41GR6	G3VM-41GR4	G3VM-41GR5	G3VM-81GR	G3VM-81GR1	Unit	Measurement conditions		
Input	LED forward voltage	Minimum	1.0							V	If=10 mA		
		Typical	1.15										
	Reverse current	Maximum	1.3							μA			
		Maximum	10										
	Capacitance between terminals	Ct	Typical	15								pF	V=0, f=1 MHz
Trigger LED forward current	IFT	Maximum	4				3			mA	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : Io=100 mA G3VM-81GR : Io=40 mA G3VM-81GR1 : Io=200 mA		
Release LED forward current	IFC	Minimum	0.2				0.1			mA	Ioff=10μA		
Output	Maximum resistance with output ON	Typical	5	1	10	2	1	16	5	Ω	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : If=5 mA, Io=Continuous load current ratings, t<1s G3VM-81GR/81GR1 : If=5 mA, Io=Continuous load current ratings		
		Maximum	8	1.5	15	3	1.5	25	8				
	Current leakage when the relay is open	ILEAK	Maximum	1								nA	G3VM-21GR/21GR1 : Voff=20 V, Ta=50°C G3VM-41GR4/41GR5/41GR6 : Voff=30 V, Ta=50°C G3VM-81GR : Voff=80 V, Ta=60°C G3VM-81GR1 : Voff=80 V, Ta=50°C
	Capacitance between terminals	COFF	Typical	1	5	1	5	10	2.5	6.5		pF	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : V=0, f=100 MHz, t<1 s G3VM-81GR/81GR1 : V=0, f=100 MHz, t<10 s
Maximum	2.5	12	2	7	14	3.5	11						
Capacitance between I/O terminals	CI-O	Typical	0.8				0.7			pF	f=1 MHz, V=0 V		
Insulation resistance between I/O terminals	RI-O	Minimum	1000							MΩ	Vi=500 VDC, RoH<=60%		
		Typical	10 <sup>8</sup>										
Turn-ON time	tON	Typical	-							ms	G3VM-21GR/21GR1/41GR4/41GR5/41GR6 : If=10 mA, RL=200 Ω, VDD=20 V (See note 2.) G3VM-81GR/81GR1 : If=5 mA, RL=200 Ω, VDD=10 V (See note 2.)		
		Maximum	0.5										
Turn-OFF time	tOFF	Typical	-							ms			
		Maximum	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.

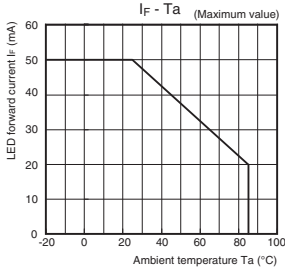
Item	Symbol		G3VM-21GR	G3VM-21GR1	G3VM-41GR6	G3VM-41GR4	G3VM-41GR5	G3VM-81GR	G3VM-81GR1	Unit
Load voltage (AC peak/DC)	VDD	Maximum	20		32			64		V
		Minimum	7		10			5		
Operating LED forward current	If	Maximum	160		250			300		mA
		Maximum	300		120			40		
Continuous load current (AC peak/DC)	Io	Maximum	160		250			300		mA
		Minimum	300		120			40		
Ambient operating temperature	Ta	Minimum	-							°C
		Maximum	60							

## Spacing and Insulation

Item	Minimum	Unit
Creepage distances	4.0	mm
Clearance distances	4.0	
Internal isolation thickness	0.1	

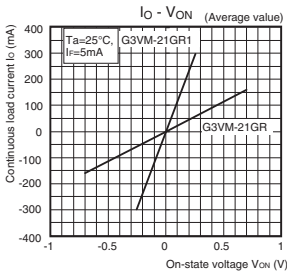
## Engineering Data

### LED forward current vs. Ambient temperature



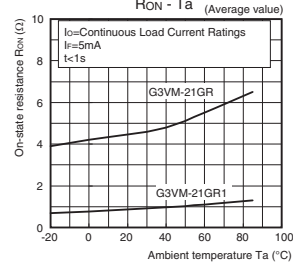
### Continuous load current vs. On-state voltage

G3VM-21GR/21GR1



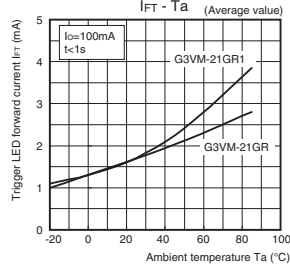
### On-state resistance vs. Ambient temperature

G3VM-21GR/21GR1

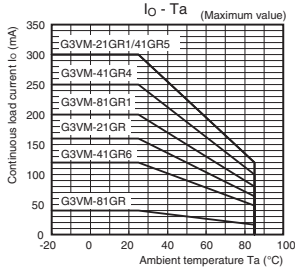


### Trigger LED forward current vs. Ambient temperature

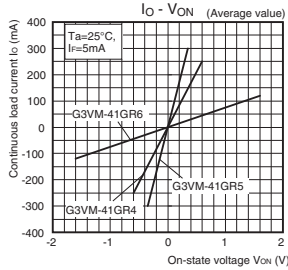
G3VM-21GR/21GR1



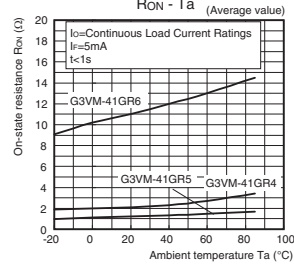
### Continuous load current vs. Ambient temperature



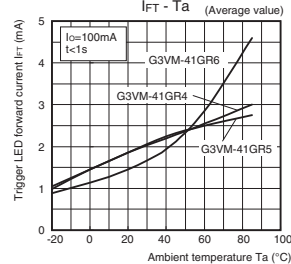
G3VM-41GR6/41GR4/41GR5



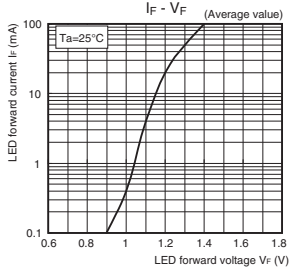
G3VM-41GR6/41GR4/41GR5



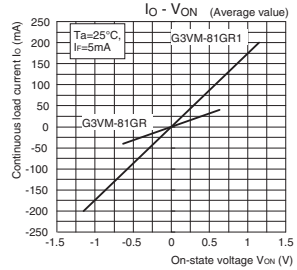
G3VM-41GR6/41GR4/41GR5



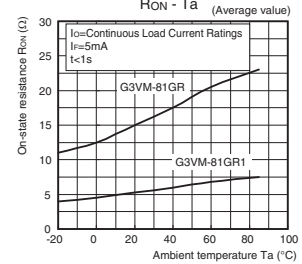
### LED forward current vs. LED forward voltage



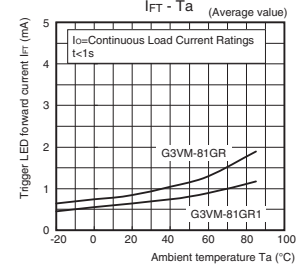
G3VM-81GR/81GR1



G3VM-81GR/81GR1

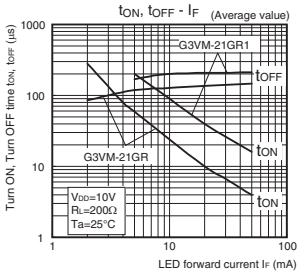


G3VM-81GR/81GR1

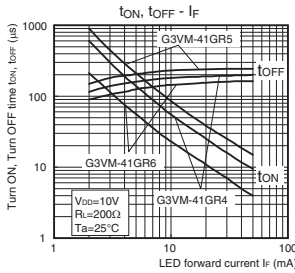


## Engineering Data

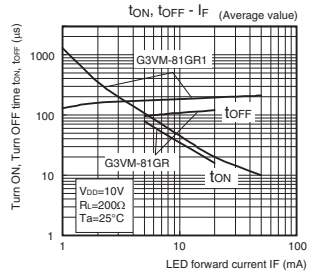
### ● Turn ON, Turn OFF time vs. LED forward current LED forward current G3VM-21GR/21GR1



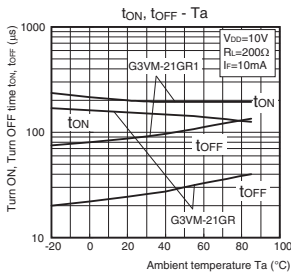
### G3VM-41GR6/41GR4/41GR5



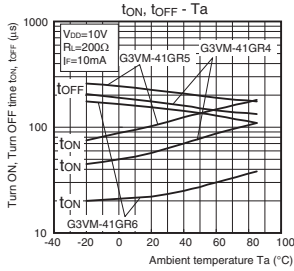
### G3VM-81GR/81GR1



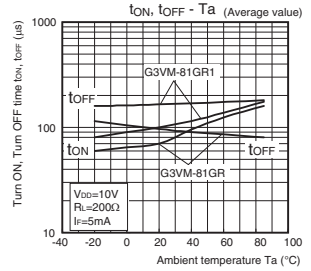
### ● Turn ON, Turn OFF time vs. Ambient temperature Ambient temperature G3VM-21GR/21GR1



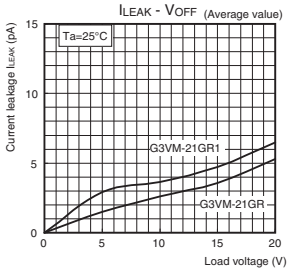
### G3VM-41GR6/41GR4/41GR5



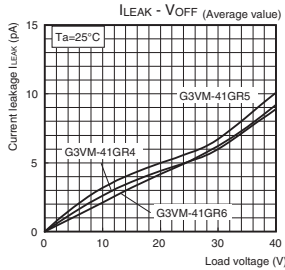
### G3VM-81GR/81GR1



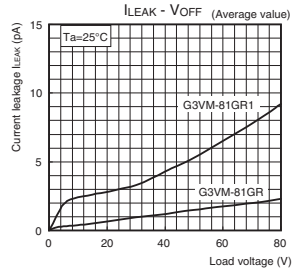
### ● Current leakage vs. Load voltage Load voltage G3VM-21GR/21GR1



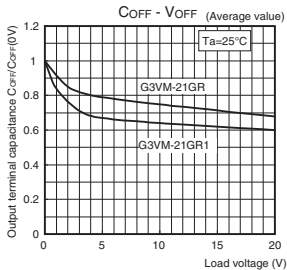
### G3VM-41GR6/41GR4/41GR5



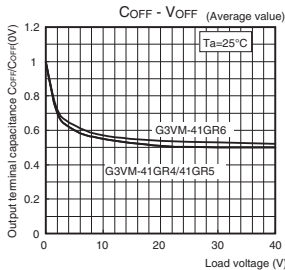
### G3VM-81GR/81GR1



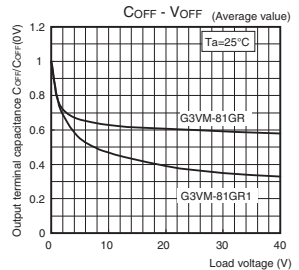
### ● Output terminal capacitance vs. Load voltage Load voltage G3VM-21GR/21GR1



### G3VM-41GR6/41GR4/41GR5



### G3VM-81GR/81GR1



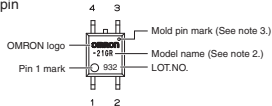
# G3VM-21GR□/41GR4/41GR5/41GR6/81GR□ MOS FET Relays

## ■ Appearance / Terminal Arrangement / Internal Connections

### ● Appearance

#### SOP (Small Outline Package)

SOP 4-pin

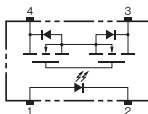


**Note: 1.** The actual product is marked differently from the image shown here.

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

**Note: 3.** The indentation in the corner diagonally opposite from the pin 1 mark is from a pin on the mold.

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

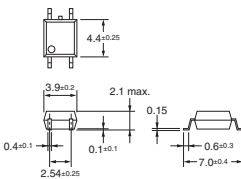


## ■ Dimensions (Unit: mm)



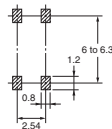
### Surface-mounting Terminals

Weight: 0.1 g




### 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.