

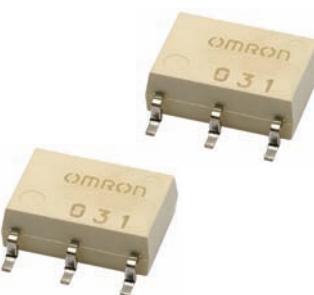
G3VM-21HR/31HR/41HR/61HR/61HR1

MOS FET Relays SOP 6-pin, High-current and Low-ON-resistance Type

MOS FET Relays in SOP 6-pin packages that achieve the low ON resistance and high switching capacitance of a mechanical relay

- Load voltage: 20 V, 30 V, 40 V, or 60 V
- 20-V Relay: Continuous load current of 2.5 A (5 A) max. *
- 30-V Relay: Continuous load current of 4 A (8 A) max. *
- 40-V Relay: Continuous load current of 2.5 A (5 A) max. *
- 60-V Relay: Continuous load current of 3.3 A (6.6 A) max. *

* Values in parentheses are for connection C.



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

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RoHS Compliant

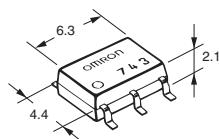
■ Application Examples

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

■ Package

(Unit : mm, Average)

SOP 6-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
2 : 20 V	1 : 1a (SPST-NO)	H : SOP 6-pin
3 : 30 V		
4 : 40 V		
6 : 60 V		
	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) *		Stick packaging		Tape packaging	
				Connection A, B	Connection C	Model	Minimum package quantity	Model	Minimum package quantity
SOP6	1a (SPST-NO)	Surface-mounting Terminals	20 V	2.5 A	5 A	G3VM-21HR	75	G3VM-21HR(TR)	2,500
			30 V	4 A	8 A	G3VM-31HR		G3VM-31HR(TR05)	500
			40 V	2.5 A	5 A	G3VM-41HR		G3VM-41HR(TR)	2,500
			60 V	2.3 A	4.6 A	G3VM-61HR		G3VM-61HR(TR)	2,500
				3.3 A	6.6 A	G3VM-61HR1		G3VM-61HR1(TR05)	500

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

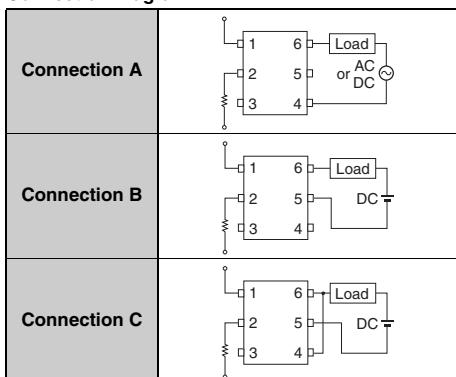
Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR)" to the end of the model number.

■Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	G3VM-21HR	G3VM-31HR	G3VM-41HR	G3VM-61HR	G3VM-61HR1	Unit	Measurement conditions
Input	LED forward current	IF	30				mA		
	LED forward current reduction rate	ΔIF/°C	-0.3				mA/°C	Ta ≥ 25°C	
	LED reverse voltage	VR	5				V		
	Connection temperature	TJ	125				°C		
Output	Load voltage (AC peak/DC)	V _{OFF}	20	30	40	60		V	
	Continuous load current	Io	2500	4000	2500	2300	3300	mA	Connection A: AC peak/DC Connection B and C: DC
			5000	8000	5000	4600	6600		
		ΔIo/°C	-33.3	-40	-33.3	-30.7	-33		
			-66.7	-80	-66.7	-61.3	-66		
	Pulse ON current	I _{OP}	7.5	12	7.5	7	10	A	t=100 ms, Duty=1/10
	Connection temperature	TJ	125				°C		
	Dielectric strength between I/O *	V _{I-O}	1500				V _{rms}	AC for 1 min	
	Ambient operating temperature	Ta	-40 to +85				°C	With no icing or condensation	Others: Ta ≥ 50°C
Ambient storage temperature		T _{STG}	-55 to +125				°C		
Soldering temperature		-	260				°C	10 s	

* 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.

Connection Diagram



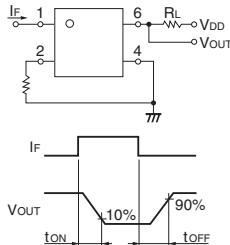
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■ Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Item		Symbol		G3VM-21HR	G3VM-31HR	G3VM-41HR	G3VM-61HR	G3VM-61HR1	Unit	Measurement conditions					
Input	LED forward voltage		VF	Minimum	1.18				V	$I_F=10\text{ mA}$					
				Typical	1.33										
				Maximum	1.48										
Reverse current		I_R	Maximum	10				μA		$V_R=5\text{ V}$					
Capacitance between terminals		C_T	Typical	70				pF		$V=0, f=1\text{ MHz}$					
Trigger LED forward current		I_{FT}	Typical	—	0.3	0.4	0.2	mA		G3VM-61HR1 : $I_O=2000\text{ mA}$ Others : $I_O=100\text{ mA}$					
			Maximum	3											
Release LED forward current		I_{FC}	Minimum	0.1				mA		$I_{OFF}=10\text{ }\mu\text{A}$					
Output	Maximum resistance with output ON	R _{ON}	Typical	0.02	0.02	0.03	0.04	0.03	Ω	G3VM-31HR: $I_F=5\text{ mA}$ $I_O=4\text{ A}$ (Connection A, B) $I_O=8\text{ A}$ (C connections), $t < 1\text{ s}$ Others: $I_F=5\text{ mA}$ $I_O=2\text{ A}$ (Connection A, B) $I_O=4\text{ A}$ (C connections), $t < 1\text{ s}$					
				0.01	0.008	0.015	0.02	0.015							
				0.005	0.004	0.008	0.01	0.008							
			Maximum	0.05	0.04	0.06	0.07	0.06							
				0.025	0.02	0.03	0.04	—							
				—	0.01	—									
Current leakage when the relay is open		I_{LEAK}	Typical	—				nA		V_{OFF} = Load voltage ratings					
			Maximum	10	1000	10	20								
Capacitance between terminals		C_{OFF}	Typical	1000	1100	1000	700	pF		$V=0, f=1\text{ MHz}$					
			Maximum	—		1500									
Capacitance between I/O terminals		C_{i-o}	Typical	0.8				pF		$f=1\text{ MHz}, V_s=0\text{ V}$					
Insulation resistance between I/O terminals		R_{i-o}	Minimum	1000				$\text{M}\Omega$		$V_{i-o}=500\text{ VDC}, \text{RoH} \leq 60\%$					
			Typical	10 ⁸											
Turn-ON time		t_{ON}	Typical	1.5	1.1	1.0	0.6	ms		G3VM-21HR : $I_F=5\text{ mA}, R_L=200\text{ }\Omega$, $V_{DD}=10\text{ V} *$ Others : $I_F=5\text{ mA}, R_L=200\text{ }\Omega$, $V_{DD}=20\text{ V} *$					
			Maximum	5											
Turn-OFF time		t_{OFF}	Typical	0.1	0.1	0.15	0.2								
			Maximum	1											

* 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.

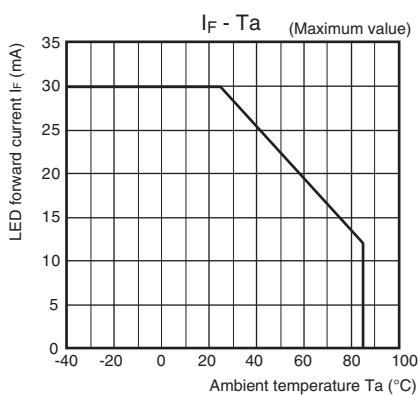
Item	Symbol	G3VM-21HR	G3VM-31HR	G3VM-41HR	G3VM-61HR	G3VM-61HR1	Unit	
Load voltage (AC peak/DC)	V_{DD}	Maximum	20	24	40	60	48	
Operating LED forward current	I_F	Minimum	5				mA	
		Typical	10		7.5			
		Maximum	20	25	20	25		
Continuous load current (AC peak/DC)	I_O	Maximum	2000	4000	2000	1800	3300	
Ambient operating temperature	T_a	Minimum	-20				$^\circ\text{C}$	
		Maximum	65					

■ Spacing and Insulation

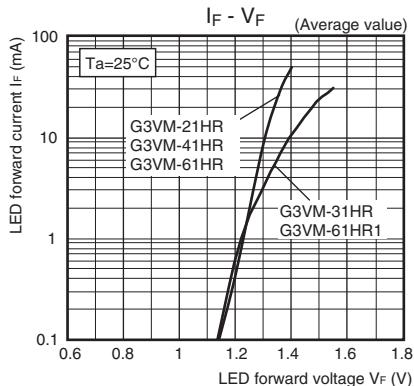
Item	Minimum	Unit
Creepage distances	4.0	
Clearance distances	4.0	mm
Internal insulation thickness	0.1	

■Engineering Data

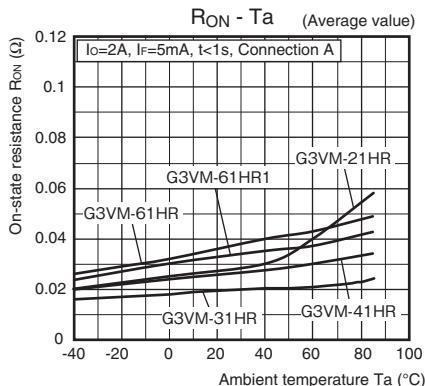
● LED forward current vs. Ambient temperature



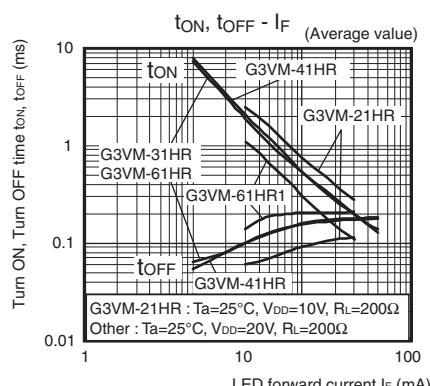
● LED forward current vs. LED forward voltage



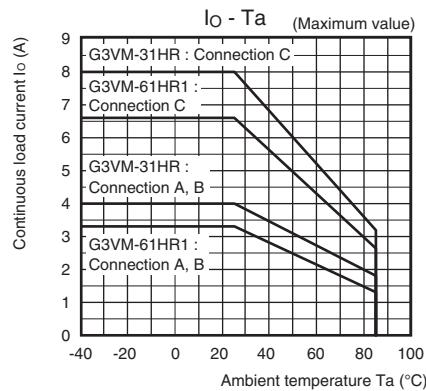
● On-state resistance vs. Ambient temperature



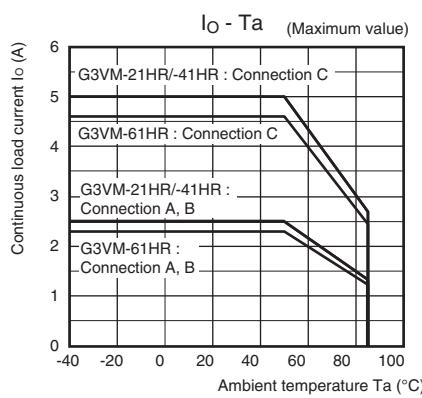
● Turn ON, Turn OFF time vs. LED forward current



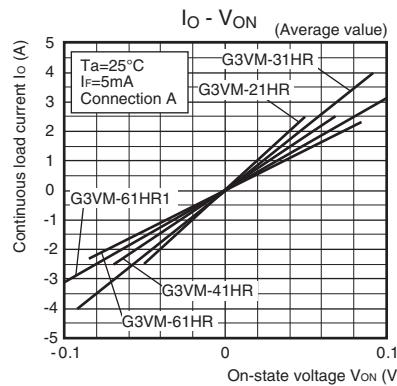
● Continuous load current vs. Ambient temperature G3VM-31HR/61HR1



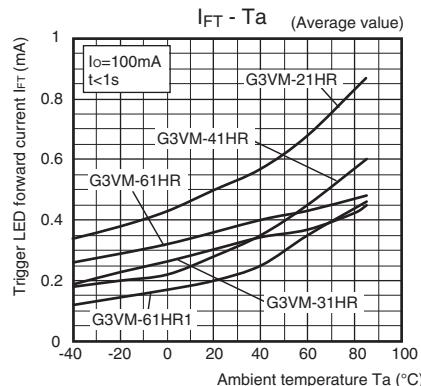
G3VM-21HR/41HR/61HR



● Continuous load current vs. On-state voltage



● Trigger LED forward current vs. Ambient temperature

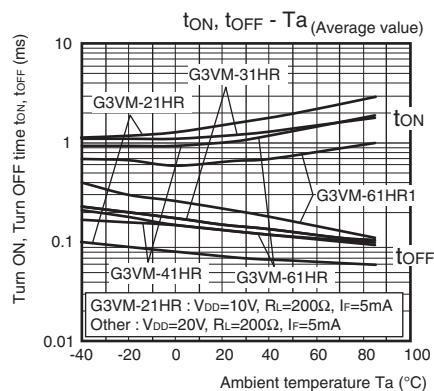


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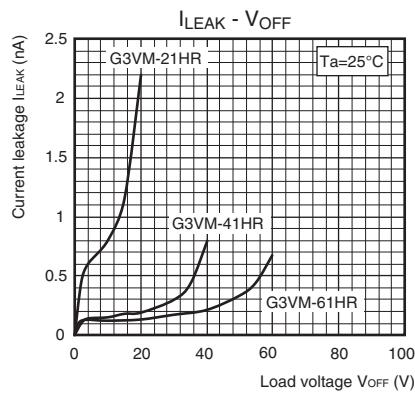
■Engineering Data

- Turn ON, Turn OFF time vs. Ambient temperature



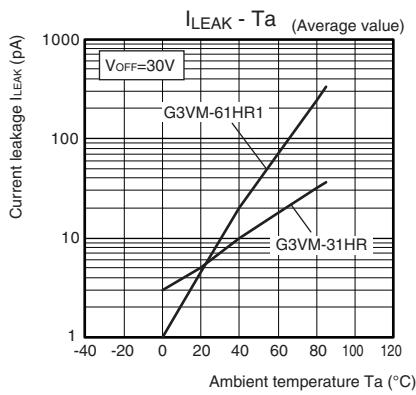
● Current leakage vs. Load voltage

G3VM-21HR/41HR/61HR



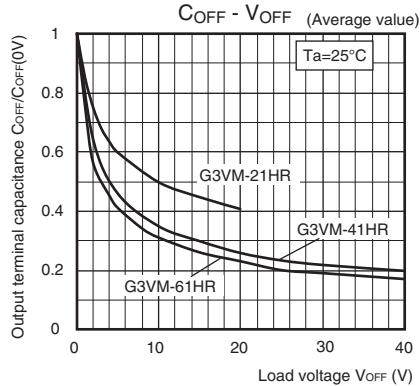
● Current leakage vs. Ambient temperature

G3VM-31HR/61HR1



- Output terminal capacitance vs. Load voltage

G3VM-21HR/41HR/61HR

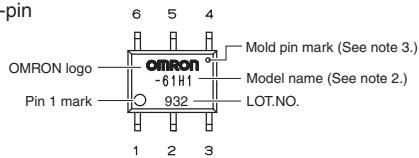


■Appearance / Terminal Arrangement / Internal Connections

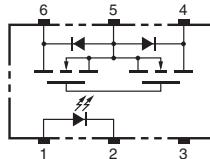
●Appearance

SOP (Small Outline Package)

SOP 6-pin



●Terminal Arrangement/Internal Connections (Top View)

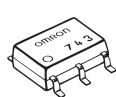


Note: 1. The actual product is marked differently from the image shown here.

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

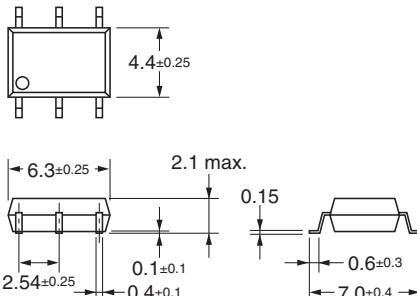
Note: 3. The indentation in the corner diagonally opposite from the pin 1 mark is from a pin on the mold.

■Dimensions (Unit: mm)



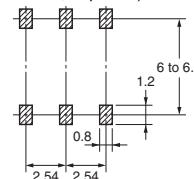
Surface-mounting Terminals

Weight: 0.13 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.

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