

G3VM-□□HR

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, 40 V, 60 V, 80 V, or 100 V
- 20-V Relay: Continuous load current of 2.5 A (5 A) max.*
- 40-V Relay: Continuous load current of 2.5 A (5 A) max.*
- 60-V Relay: Continuous load current of 2.3 A (4.6 A) max.*
- 80-V Relay: Continuous load current of 1.25 A (2.5 A) max.*
- 100-V Relay: Continuous load current of 1.4 A (2.8 A) max.*

* Values in parentheses are for connection C.



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



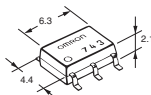
RoHS Compliant

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

- Load Voltage**
2 : 20 V
4 : 40 V
6 : 60 V
8 : 80 V
10 : 100 V
- Contact form**
1 : 1a (SPST-NO)
- Package**
H : SOP 6-pin
- Additional functions**
R : Low ON resistance
- 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	
				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 pcs.	G3VM-21HR(TR)	2,500 pcs.
			40 V			G3VM-41HR		G3VM-41HR(TR)	
			60 V	2.3 A	4.6 A	G3VM-61HR		G3VM-61HR(TR)	
			80 V	1.25 A	2.5 A	G3VM-81HR		G3VM-81HR(TR)	
			100 V	1.4 A	2.8 A	G3VM-101HR		G3VM-101HR(TR)	

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

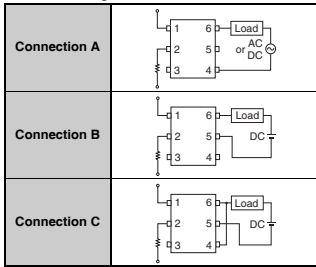
Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR)" to the end of the model number.

■ Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	G3VM-21HR	G3VM-41HR	G3VM-61HR	G3VM-81HR	G3VM-101HR	Unit	Measurement conditions	
Input	LED forward current	IF	30			50	30	mA		
	LED forward current reduction rate	$\Delta I_F/\text{°C}$	-0.3			-0.5	-0.3	mA/°C	Ta ≥ 25°C	
	LED reverse voltage	VR	5						V	
	Connection temperature	TJ	125						°C	
Load voltage (AC peak/DC)		V _{OFF}	20	40	60	80	100	V		
Output	Continuous load current	Connection A	2500			2300	1250	1400	mA	Connection A: AC peak/DC Connection B and C: DC
		Connection B	5000			4600	2500	2800		
	ON current reduction rate	Connection A	-33.3			-30.7	-12.5	-18.7	mA/°C	G3VM-81HR : Ta ≥ 25°C Others : Ta ≥ 50°C
		Connection B	-66.6			-66.7	-61.3	-25.0		
		Connection C	-			7	-61.3	-37.3		
Pulse ON current	I _{OP}	7.5			7	3.75	4	A	t=100 ms, Duty=1/10	
Connection temperature		TJ	125						°C	
Dielectric strength between I/O (See note 1.)		V _{I-O}	1500					V _{rms}	AC for 1 min	
Ambient operating temperature		Ta	-40 to +85			-20 to +85	-40 to +85	°C	With no icing or condensation	
Ambient storage temperature		Tstg	-55 to +125			-40 to +125	-55 to +125	°C		
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.

Connection Diagram

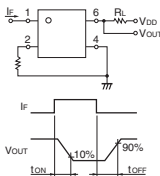


Introduction
 General purpose
 High-side-voltage
 Multi-contact pair (2A, 2B, and 1A1)
 High-current and low ON-resistance
 Small and high-dielectric-strength
 High-dielectric-strength
 Current-limiting
 Low-voltage-operation and low ON-resistance
 Small and High-Side-voltage
 Certified Models with Standards Certification
 DIP
 SOP
 SSOP
 USOP
 VSON
 G3VM-□HR

■Electrical Characteristics (Ta = 25°C)

Item		Symbol	G3VM-21HR	G3VM-41HR	G3VM-61HR	G3VM-81HR	G3VM-101HR	Unit	Measurement conditions	
Input	LED forward voltage	V _F	Minimum	1.18		1.0	1.18	V	I _F =10 mA	
		Typical	1.33		1.15	1.33				
		Maximum	1.48		1.3	1.48				
	Reverse current	I _R	Maximum	10				μA	V _R =5 V	
	Capacitance between terminals	C _T	Typical	70			15	70	pF	V=0, f=1 MHz
	Trigger LED forward current	I _{FT}	Typical	–	0.4		2	0.4	mA	G3VM-21HR/41HR/61HR/101HR : I _o =100 mA G3VM-81HR : I _o =1250 mA
Maximum	3			5	3					
Release LED forward current	I _{FC}	Minimum	0.1			0.2	0.1	mA	I _{OFF} =10 μA	
Output	Maximum resistance with output ON	R _{ON}	Typical	0.02	0.03	0.04	0.11	0.1	Ω	G3VM-21HR/41HR/61HR : I _F =5 mA, I _o =2 A (A or B connections), I _o =4 A (C connections), t < 1 s G3VM-81HR : I _F =5 mA, I _o =Continuous load current ratings G3VM-101HR : I _F =5 mA, I _o =Continuous load current ratings, t < 1 s
				0.01	0.015	0.02	0.06	0.05		
				0.005	0.008	0.01	0.03	0.025		
			Maximum	0.05	0.06	0.07	0.15	0.2		
				0.025	0.03	0.04	0.08	0.1		
				–			0.04	–		
Current leakage when the relay is open	I _{LEAK}	Typical	–			1.2	–	nA	G3VM-21HR/41HR/61HR/101HR : V _{OFF} =Load voltage ratings G3VM-81HR : V _{OFF} =20 V, T _A =50°C	
		Maximum	10			1.5	10			
Capacitance between terminals	C _{OFF}	Typical	1000			460	1000	pF	G3VM-21HR/41HR/61HR/101HR : V=0, f=1 MHz G3VM-81HR : V=0, f=100 MHz	
		Maximum	–			1000	–			
Capacitance between I/O terminals	C _{I-O}	Typical	0.8					pF	f=1 MHz, V _S =0 V	
Insulation resistance between I/O terminals	R _{I-O}	Minimum	1000					MΩ	V _{I-O} =500 VDC, R _{oH} ≤50%	
		Typical	10 ⁸							
Turn-ON time	t _{ON}	Typical	1.5	1.0		2.0	1.0	ms	G3VM-21HR : I _F =5 mA, R _L =200 Ω, V _{DD} =10 V (See note 2.) G3VM-41HR/61HR/81HR/101HR : I _F =5 mA, R _L =200 Ω, V _{DD} =20 V (See note 2.)	
		Maximum	5.0			3.0	5.0			
Turn-OFF time	t _{OFF}	Typical	0.1	0.15		0.7	0.15	ms	G3VM-41HR/61HR/81HR/101HR : I _F =5 mA, R _L =200 Ω, V _{DD} =20 V (See note 2.)	
		Maximum	1.0							

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.

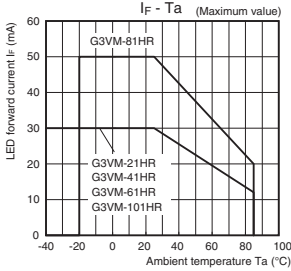
Item	Symbol	G3VM-21HR	G3VM-41HR	G3VM-61HR	G3VM-81HR	G3VM-101HR	Unit
Load voltage (AC peak/DC)	V _{DD}	Maximum	20	40	60	64	V
		Minimum	5				
Operating LED forward current	I _F	Typical	10	7.5		–	mA
		Maximum	20			30	
		Maximum	2000			1800	
Continuous load current (AC peak/DC)	I _o	Maximum	2000		1800	1250	1100
		Minimum	–20				
Ambient operating temperature	T _a	Minimum	–20				°C
		Maximum	65			60	

■Spacing and Insulation

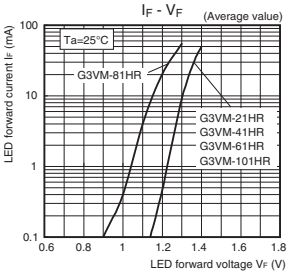
Item	Minimum	Unit
Creepage distances	4.0	mm
Clearance distances	4.0	
Internal isolation thickness	0.1	

Engineering Data

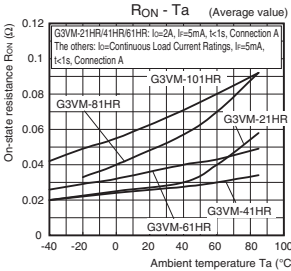
LED forward current vs. Ambient temperature



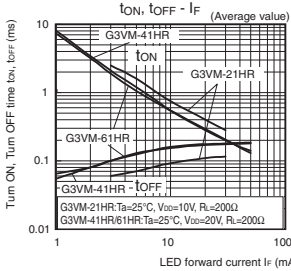
LED forward current vs. LED forward voltage



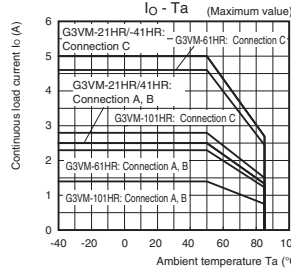
On-state resistance vs. Ambient temperature



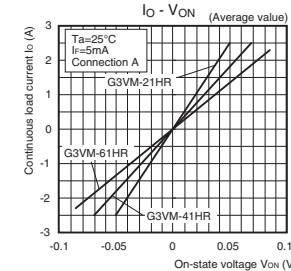
Turn ON, Turn OFF time vs. LED forward current



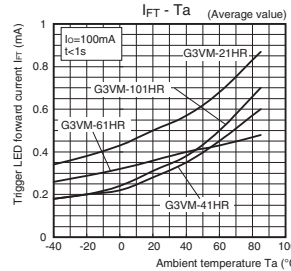
Continuous load current vs. Ambient temperature



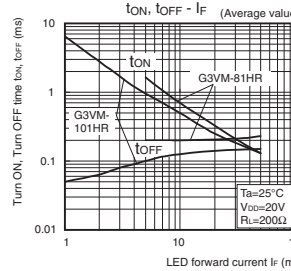
Continuous load current vs. On-state voltage



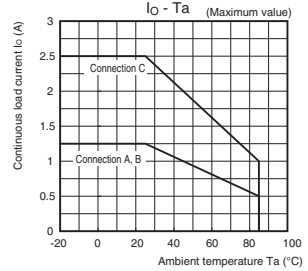
Trigger LED forward current vs. Ambient temperature



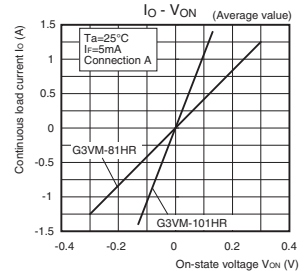
G3VM-81HR/101HR



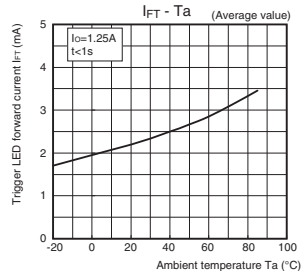
G3VM-81HR



G3VM-81HR/101HR



G3VM-81HR



Introduction
General purpose
High-side voltage
Multi-contact pair
Low-ON resistance
High-current and high-dielectric strength
Small and high-strength
High-dielectric strength
Current-limiting
Low-ohmic-resistance and low-ON resistance
Small and High-voltage
Certified Models with Standards Certification

DIP
SOP
SSOP
USOP
VSON

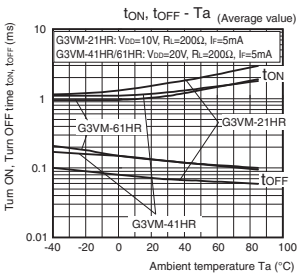
G3VM-□HR

Engineering Data

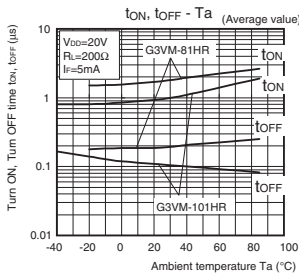
Turn ON, Turn OFF time vs.

Ambient temperature

G3VM-21HR/41HR/61HR

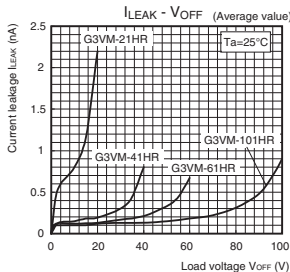


G3VM-81HR/101HR



Current leakage vs. Load voltage

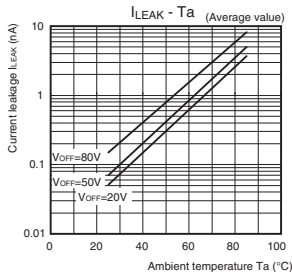
G3VM-21HR/41HR/61HR/101HR



Current leakage vs.

Ambient temperature

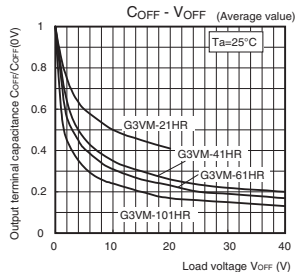
G3VM-81HR



Output terminal capacitance vs.

Load voltage

G3VM-21HR/41HR/61HR/101HR

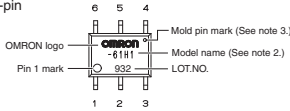


■ Appearance / Terminal Arrangement / Internal Connections

● Appearance

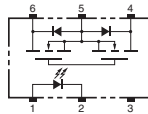
SOP (Small Outline Package)

SOP 6-pin

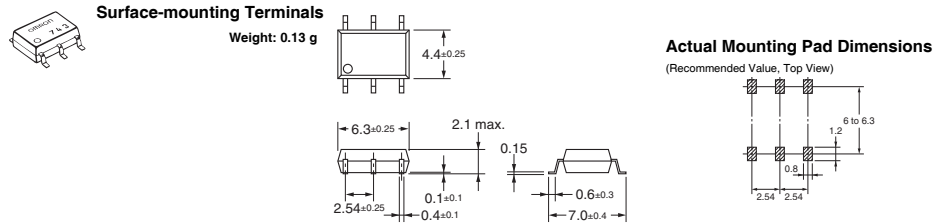


- Note:** 1. The actual product is marked differently from the image shown here.
Note: 2. "G3VM" does not appear in the model number on the Relay.
Note: 3. The indentation in the corner diagonally opposite from the pin 1 mark is from a pin on the mold.

● Terminal Arrangement/Internal Connections (Top View)



■ Dimensions (Unit: mm)



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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(2a, 2b, and 4a/b)
High-current and
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and Low-ON-resistance
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