

# G3VM-□BR□/□ER□

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

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

- Load voltage: 20 V, 40 V, 60 V, or 100 V
- 20-V Relay: Continuous load current of 4 A (8 A) max. \*
- 40-V Relay: Continuous load current of 3.5 A (7 A) max. \*
- 60-V G3VM-61BR/ER Relay: Continuous load current of 2.5 A max.
- 60-V G3VM-61BR1/ER1 Relay: Continuous load current of 3 A (6 A) max. \*
- 100-V Relay: Continuous load current of 2 A (4 A) max. \*

\* Values in parentheses are for connection C.



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

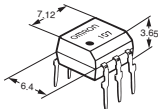
RoHS Compliant

### Application Examples

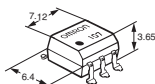
- Communication equipment
- Security equipment
- Power circuit
- Test & Measurement equipment
- Industrial equipment

### Package (Unit : mm, Average)

DIP 6-pin  
PCB Terminals



Surface-mounting Terminals



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  
10 : 100 V
- Contact form**  
1 : 1a (SPST-NO)
- Package**  
B : DIP 6-pin with PCB terminals  
E : DIP 6-pin with surface-mounting terminals
- Additional functions**  
R: Low ON resistance
- Other informations**  
When specifications overlap, serial code is added in the recorded order.

### Ordering Information

Package	Contact form	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
							PCB Terminals	Surface-mounting Terminals			
DIP6	1a (SPST-NO)	20 V	4 A	8 A	G3VM-21BR	G3VM-21ER	50 pcs.	G3VM-21ER(TR)	1,500 pcs.		
		40 V	3.5 A	7 A	G3VM-41BR	G3VM-41ER		G3VM-41ER(TR)			
		60 V	2.5 A	—	G3VM-61BR	G3VM-61ER		G3VM-61ER(TR)			
			3 A	6 A	G3VM-61BR1	G3VM-61ER1		G3VM-61ER1(TR)			
100 V	2 A	4 A	G3VM-101BR	G3VM-101ER	G3VM-101ER(TR)						

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

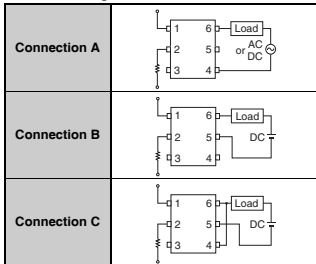
Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR)" to the end of the model number.

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

Item		Symbol	G3VM-21BR G3VM-21ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-101BR G3VM-101ER	Unit	Measurement conditions	
Input	LED forward current	IF	30						mA	
	Repetitive peak LED forward current	IFP	1						A	100 μs pulses, 100 pps
	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	
Load voltage (AC peak/DC)		V <sub>OFF</sub>	20	40	60		100	V		
Output	Continuous load current	Connection A	Io	4	3.5	2.5	3	2	A	Connection A: AC peak/DC Connection B and C: DC
		Connection B		8	7	-	6	4		
		Connection C								
	ON current reduction rate	Connection A	ΔIo/°C	-40	-35	-22	-30	-20	mA/°C	Ta ≥ 25°C
		Connection B		-80	-70	-	-60	-40		
Connection C										
Pulse ON current	I <sub>op</sub>	12	10.5	7.5	9	6	A	t <sub>on</sub> =100 ms, Duty=1/10		
Connection temperature	TJ	125						°C		
Dielectric strength between I/O (See note 1.)		V <sub>I-O</sub>	2,500						V <sub>rms</sub>	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



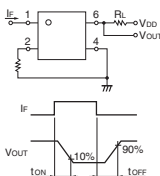
**Note:** Only connection A can be used for the G3VM-61BR/ER.

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, low-impedance and low-on-resistance  
Small and High-side-voltage  
Certified Models with Standards Certification  
DIP  
SOP  
SSOP  
USOP  
VSON  
G3VM-□BR□/□ER□

## ■Electrical Characteristics (Ta = 25°C)

Item		Symbol	G3VM-21BR G3VM-21ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-101BR G3VM-101ER	Unit	Measurement conditions
LED forward voltage	VF	Minimum	1.18					V	IF=10 mA
		Typical	1.33						
		Maximum	1.48						
	Reverse current	IR	10						
Capacitance between terminals	CT	Typical	70					pF	V=0, f=1 MHz
Trigger LED forward current	IFT	Typical	0.5	1	0.5			mA	Io=1 A
		Maximum	3						
Release LED forward current	IFC	Minimum	0.1					mA	IoFF=10 μA
Maximum resistance with output ON	RON	Typical	20	30	65	40	100	mΩ	G3VM-21BR/21ER/41BR/41ER/ 61BR1/61ER1/101BR/101ER : IF=5 mA, RL=200 Ω, Io=2 A (Connection A and B), Io=4 A (Connection C), t<1 s G3VM-61BR/ER : IF=10 mA, t=10 ms, Io=2 A
		Maximum	50	60	100	70	200		
		Typical	10	15	-		20		
Current leakage when the relay is open	ILEAK	Typical	-		0.001	-		μA	VOFF=Load voltage ratings
		Maximum	1		0.01	1			
Capacitance between terminals	COFF	Typical	1000		400	1000		pF	V=0, f=1 MHz
Capacitance between I/O terminals	CI-O	Typical	0.8					pF	f=1 MHz, Vs=0 V
Insulation resistance between I/O terminals	RI-O	Minimum	1000					MΩ	Vi-o=500 VDC, RoH≤60%
		Typical	10 <sup>8</sup>						
Turn-ON time	tON	Typical	2.5	2	1	2		ms	G3VM-21BR/21ER/41BR/41ER/ 61BR1/61ER1/101BR/101ER : IF=5 mA, RL=200 Ω, VDD=20 V (See note 2.) G3VM-61BR/ER : IF=10 mA, RL=200 Ω, VDD=20 V (See note 2.)
		Maximum	5		1.5	5			
Turn-OFF time	tOFF	Typical	0.1		0.2	0.1		ms	G3VM-61BR/ER : IF=10 mA, RL=200 Ω, VDD=20 V (See note 2.)
		Maximum	1		0.4	1			

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-21BR G3VM-21ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-101BR G3VM-101ER	Unit	
Load voltage (AC peak/DC)	VDD	Maximum 16	32	48		80	V	
Operating LED forward current	IF	Minimum	5		10	5	mA	
		Typical	10		-	10		
		Maximum	25		20	25		
Continuous load current (AC peak/DC)	Io	Maximum	4	3.5	2.5	3	2	A
		Minimum	-20					
Ambient operating temperature	Ta	Minimum	-					°C
		Maximum	65		60	65		

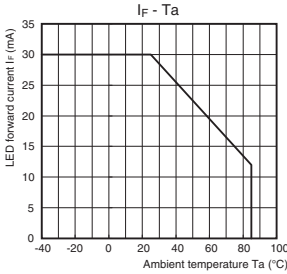
## ■Spacing and Insulation

Item	Minimum	Unit
Creepage distances	7.0	mm
Clearance distances	7.0	
Internal isolation thickness	0.4	

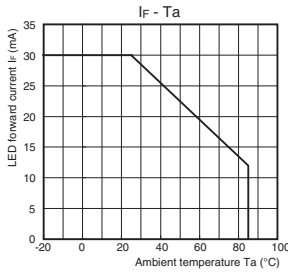
## Engineering Data

### LED forward current vs. Ambient temperature

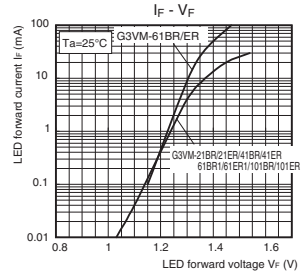
G3VM-21BR/21ER/41BR/41ER/  
61BR1/61ER1/101BR/101ER



G3VM-61BR/61ER

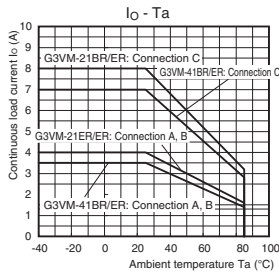


### LED forward current vs. LED forward voltage

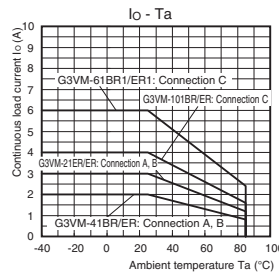


### Continuous load current vs. Ambient temperature

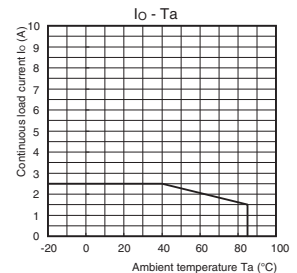
G3VM-21BR/21ER/41BR/41ER



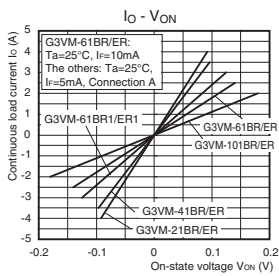
G3VM-61BR1/61ER1/101BR/101ER



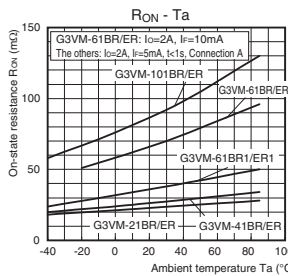
G3VM-61BR/61ER



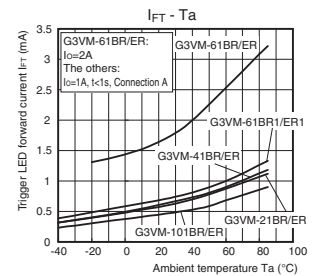
### Continuous load current vs. On-state voltage



### On-state resistance vs. Ambient temperature



### Trigger LED forward current vs. Ambient temperature

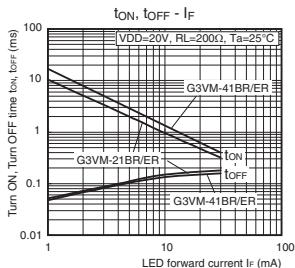


## Engineering Data

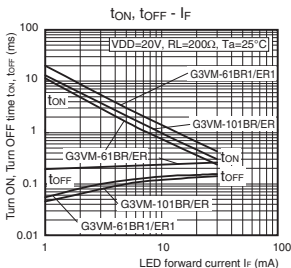
### ● Turn ON, Turn OFF time vs.

#### LED forward current

G3VM-21BR/21ER/41BR/41ER



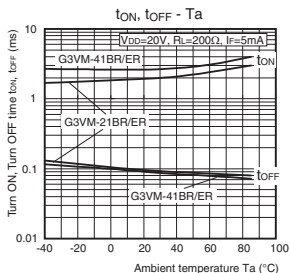
G3VM-61BR/61ER/61BR1/61ER1/101BR/101ER



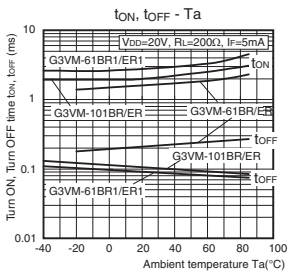
### ● Turn ON, Turn OFF time vs.

#### Ambient temperature

G3VM-21BR/21ER/41BR/41ER

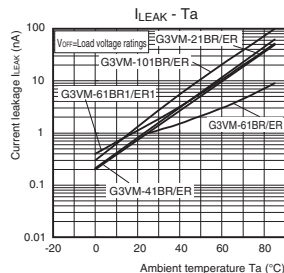


G3VM-61BR/61ER/61BR1/61ER1/101BR/101ER



### ● Current leakage vs.

#### Ambient temperature



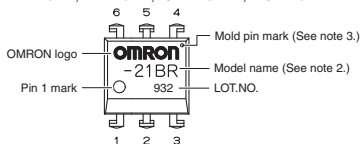
## Appearance / Terminal Arrangement / Internal Connections

### ● Appearance

#### DIP (Dual In-line Package)

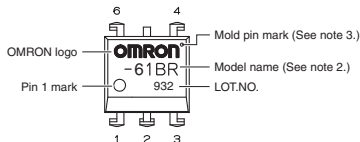
DIP 6-pin

G3VM-21BR/ER, -41BR/ER, -61BR1/ER1, -101BR/ER



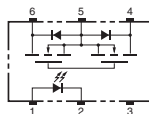
Special DIP 6-pin \*

G3VM-61BR/ER

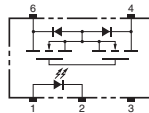


### ● Terminal Arrangement/Internal Connections (Top View)

G3VM-21BR/ER, -41BR/ER, -61BR1/ER1, -101BR/ER



G3VM-61BR/ER



**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.

\* The external dimensions of the standard DIP 6-pin are the same, but the number of terminals is different.

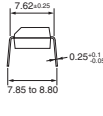
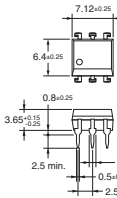
## ■Dimensions (Unit: mm)

G3VM-21BR/41BR/61BR1/101BR



### PCB Terminals

Weight: 0.4 g

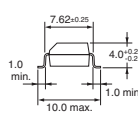
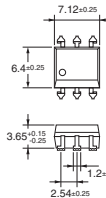


G3VM-21ER/41ER/61ER1/101ER

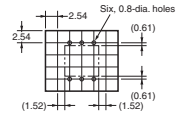


### Surface-mounting Terminals

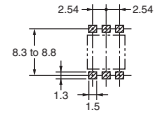
Weight: 0.4 g



### PCB Dimensions (BOTTOM VIEW)



### Actual Mounting Pad Dimensions (Recommended Value, Top View)



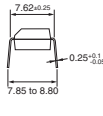
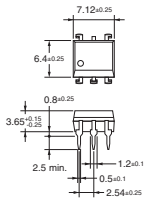
Note: The actual product is marked differently from the image shown here.

G3VM-61BR



### PCB Terminals

Weight: 0.4 g

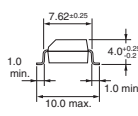
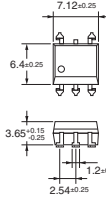


G3VM-61ER

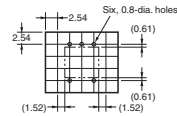


### Surface-mounting Terminals

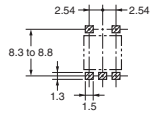
Weight: 0.4 g



### PCB Dimensions (BOTTOM VIEW)




### 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.