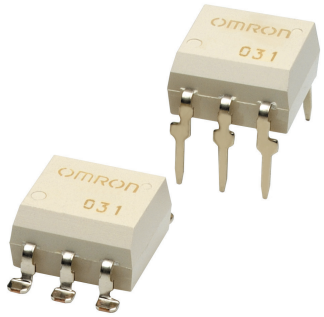
G3VM-□BR□/□ER□

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, 30 V, 40 V, 60 V, or 100 V**
- **20-V Relay: Continuous load current of 4 A (8 A) max. ✻**
- **30-V Relay: Continuous load current of 5 A (10 A) max. ✻**
- **40-V Relay: Continuous load current of 3.5 A (7 A) max. ✻**
- **60-V Relay: Continuous load current of 4 A (8 A) max. ✻**
- **100-V Relay: Continuous load current of 3.5 A (7 A) max. ✻**

✻ Values in parentheses are for connection C.



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

RoHS Compliant

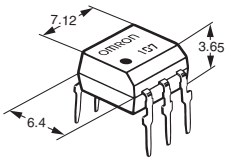
■Application Examples

- **Communication equipment**
- **Security equipment**
- **Test & Measurement equipment**
- **Industrial equipment**

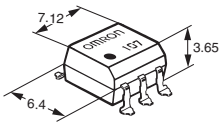
■Package (Unit : mm, Average)

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

1. Load Voltage
2 : 20 V
3 : 30 V
4 : 40 V
6 : 60 V
10 : 100 V

2. Contact form
1 : 1a (SPST-NO)

3. Package
B : DIP 6-pin with PCB terminals
E : DIP 6-pin with surface-mounting terminals

4. Additional functions
R: Low ON resistance

5. 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	
					Model		Minimum package quantity	Model	Minimum package quantity
			Connection A, B	Connection C	PCB Terminals	Surface-mounting 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.
		30 V	5 A	10 A	G3VM-31BR	G3VM-31ER		G3VM-31ER(TR05)	500 pcs.
		40 V	3.5 A	7 A	G3VM-41BR	G3VM-41ER		G3VM-41ER(TR)	1,500 pcs.
		60 V	2.5 A	–	G3VM-61BR	G3VM-61ER		G3VM-61ER(TR)	
			3 A	6 A	G3VM-61BR1	G3VM-61ER1		G3VM-61ER1(TR)	
			4 A	8 A	G3VM-61BR2	G3VM-61ER2		G3VM-61ER2(TR05)	500 pcs.
		100 V	2 A	4 A	G3VM-101BR	G3VM-101ER		G3VM-101ER(TR)	1,500 pcs.
			3.5 A	7 A	G3VM-101BR1	G3VM-101ER1		G3VM-101ER1(TR05)	500 pcs.

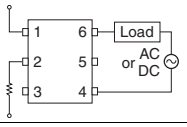
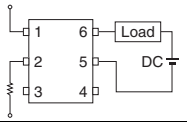
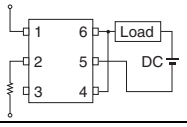
✻ The AC peak and DC value are given for the load voltage and continuous load current.
Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR)" to the end of the model number.

■Absolute Maximum Ratings (Ta = 25°C)

Item			Symbol	G3VM-21BR G3VM-21ER	G3VM-31BR G3VM-31ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-61BR2 G3VM-61ER2	G3VM-101BR G3VM-101ER	G3VM-101BR1 G3VM-101ER1	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	6	5			6	5	6	V	
	Connection temperature		TJ	125								°C	
Output	Load voltage (AC peak/DC)		VOFF	20	30	40	60			100		V	
	Continuous load current	Connection A	IO	4	5	3.5	2.5	3	4	2	3.5	A	Connection A: AC peak/DC Connection B and C: DC
		Connection B					–						
		Connection C		8	10	7		6	8	4	7		
	ON current reduction rate	Connection A	ΔIO/°C	-40	-50	-35	-22	-30	-40	-20	-35	mA/°C	Ta ≥ 25°C
		Connection B					–						
		Connection C		-80	-100	-70		-60	-80	-40	-70		
	Pulse ON current		IOP	12	15	10.5	7.5	9	12	6	10.5	A	t=100 ms, Duty=1/10
	Connection temperature		TJ	125								°C	
Dielectric strength between I/O ✻			VI-O	2,500								Vrms	AC for 1 min
Ambient operating temperature			Ta	-40 to +85	-40 to +110	-40 to +85	-20 to +85	-40 to +85	-40 to +110	-40 to +85	-40 to +110	°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

✻ 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

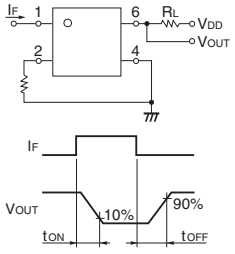
Connection A	
Connection B	
Connection C	

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

■Electrical Characteristics (Ta = 25°C)

Item			Symbol		G3VM-21BR G3VM-21ER	G3VM-31BR G3VM-31ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-61BR2 G3VM-61ER2	G3VM-101BR G3VM-101ER	G3VM-101BR1 G3VM-101ER1	Unit	Measurement conditions
Input	LED forward voltage		V_F	Minimum	1.18	1.5	1.18			1.5	1.18	1.5	V	I_F=10 mA
				Typical	1.33	1.64	1.33			1.64	1.33	1.64		
				Maximum	1.48	1.8	1.48			1.8	1.48	1.8		
	Reverse current		I_R	Maximum	10								μA	V_R=5 V
	Capacitance between terminals		C_T	Typical	70								pF	V=0, f=1 MHz
	Trigger LED forward current		I_{FT}	Typical	0.5	0.2	0.5	1	0.5	0.3	0.5	0.2	mA	I_O=1 A
				Maximum	3									
	Release LED forward current		I_{FC}	Minimum	0.1	0.01	0.1			0.01	0.1	0.01	mA	I_{OFF}=10 μA
Output	Maximum resistance with output ON	Connection A	R_{ON}	Typical	20		30	65	40	35	100	50	mΩ	G3VM-21BR/21ER/ 41BR/41ER/61BR1/ 61ER1/101BR/101ER: I_F=5 mA,Io=2 A G3VM-61BR/61ER I_F=10 mA, t=10 ms, Io=2 A G3VM-31BR/31ER/ 61BR2/61ER2/ 101BR1/101ER1: I_F=5 mA Io=3 A t < 1s
				Maximum	50	40	60	100	70	60	200	80		
		Connection B		Typical	10		15	–	20	18	50	24		G3VM-21BR/21ER/ 41BR/41ER/61BR1/ 61ER1/101BR/101ER: I_F=5 mA, Io=2 A G3VM-31BR/31ER: I_F=5 mA, Io=5 A, t < 1s G3VM-61BR2/61ER2: I_F=5 mA, Io=4 A, t < 1s G3VM-101BR1/101ER1: I_F=5 mA, Io=3.5 A, t < 1s
		Connection C		Typical	5		8		10	9	25	12		G3VM-21BR/21ER/ 41BR/41ER/61BR1/ 61ER1/101BR/101ER: I_F=5 mA, Io=4 A, t<1s G3VM-31BR/31ER: I_F=5 mA, Io=10 A, t < 1s G3VM-61BR2/61ER2: I_F=5 mA, Io=8 A, t < 1s G3VM-101BR1/101ER1: I_F=5 mA, Io=7 A, t < 1s
	Current leakage when the relay is open		I_{LEAK}	Typical	–	0.01	–	0.001	–	0.01	–	0.01	μA	V_{OFF}=Load voltage ratings
				Maximum	1			0.01	1					
	Capacitance between terminals		C_{OFF}	Typical	1000	1100	1000	400	1100	640	1000	450	pF	V=0, f=1 MHz
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, RoH ≤ 60%
				Typical	10^8									
Turn-ON time			t_{ON}	Typical	2.5	0.8	2	3	2	1.2	2	0.8	ms	I_F=5 mA, R_L=200 Ω, V_{DD}=20 V ✻
				Maximum	5			1.5	5					
Turn-OFF time			t_{OFF}	Typical	0.1			0.6	0.1					
				Maximum	1	0.5	1	0.2	1	0.5	1	0.5		

✻ 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-31BR G3VM-31ER	G3VM-41BR G3VM-41ER	G3VM-61BR G3VM-61ER	G3VM-61BR1 G3VM-61ER1	G3VM-61BR2 G3VM-61ER2	G3VM-101BR G3VM-101ER	G3VM-101BR1 G3VM-101ER1	Unit
Load voltage (AC peak/DC)	V_{DD}	Maximum	16	24	32	48			80		V
Operating LED forward current	I_F	Minimum	5			10	5				mA
		Typical	10			–	10				
		Maximum	25			20	25				
Continuous load current (AC peak/DC)	I_O	Maximum	4	5	3.5	2.5	3	4	2	3.5	A
Ambient operating temperature	Ta	Minimum	-20	-40	-20			-40	-20	-40	°C
		Maximum	65	85	65	60	65	85	65	85	

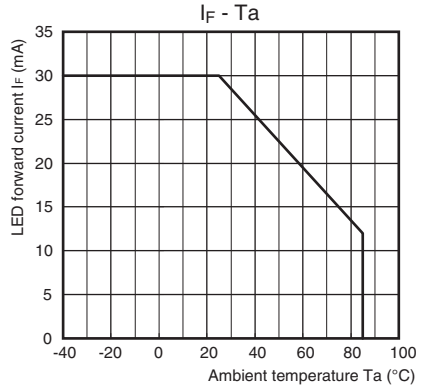
■Spacing and Insulation

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

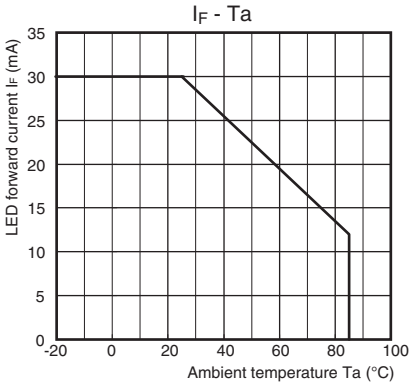
■Engineering Data

● LED forward current vs. Ambient temperature

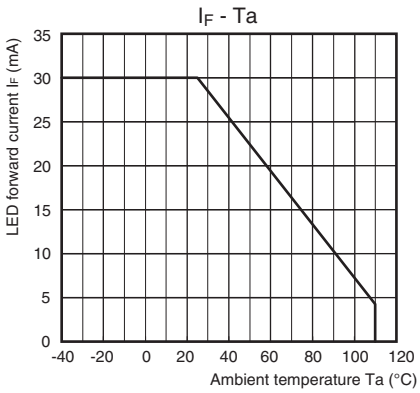
G3VM-21BR/21ER/41BR/41ER/61BR1/61ER1/101BR/101ER



G3VM-61BR/61ER

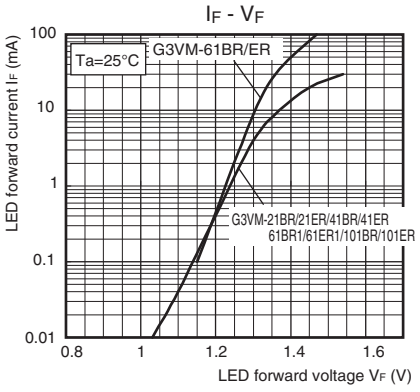


G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1

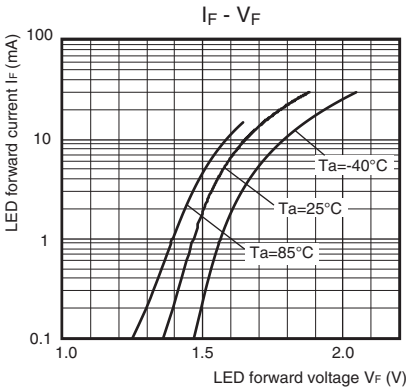


● LED forward current vs. LED forward voltage

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

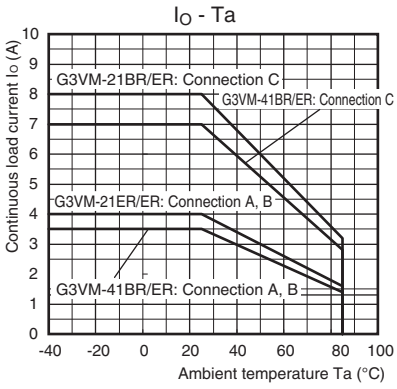


G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1

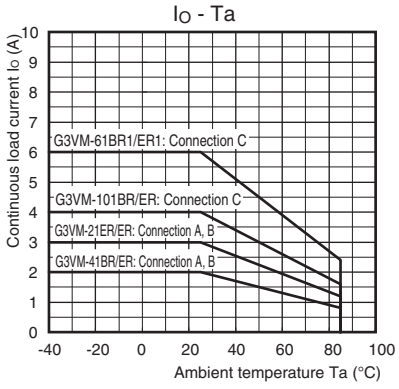


● Continuous load current vs. Ambient temperature

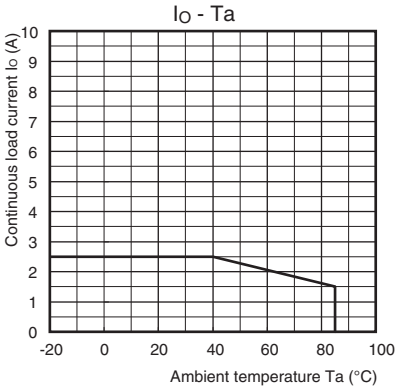
G3VM-21BR/21ER/41BR/41ER



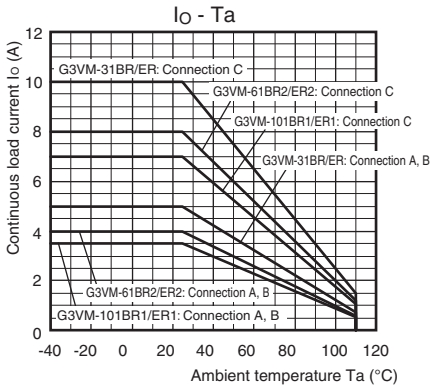
G3VM-61BR1/61ER1/101BR/101ER



G3VM-61BR/61ER



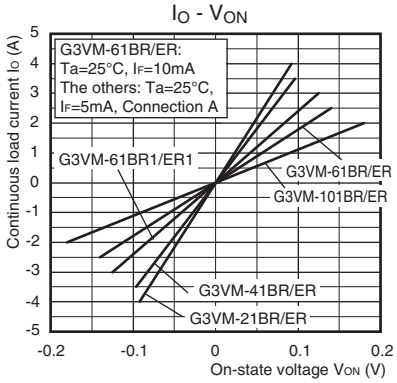
G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1



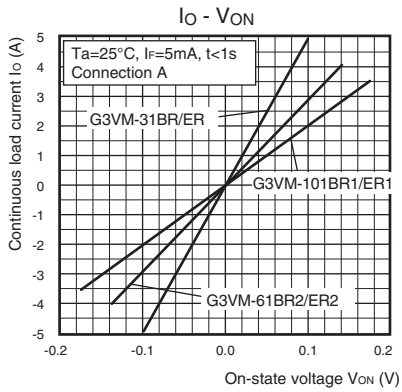
■Engineering Data

●Continuous load current vs. On-state voltage

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

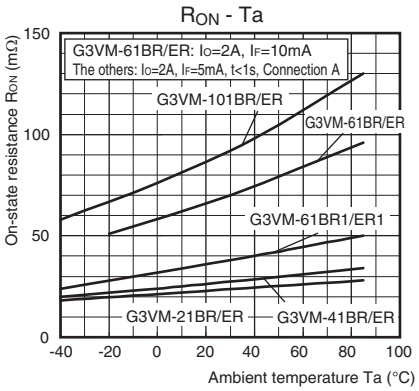


G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1



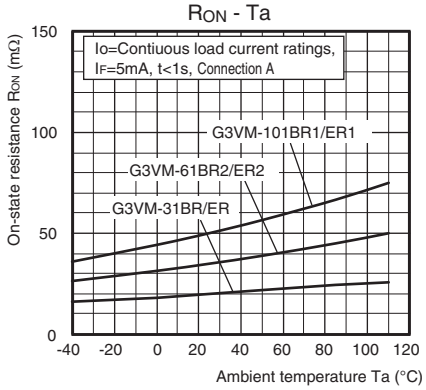
●On-state resistance vs. Ambient temperature

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

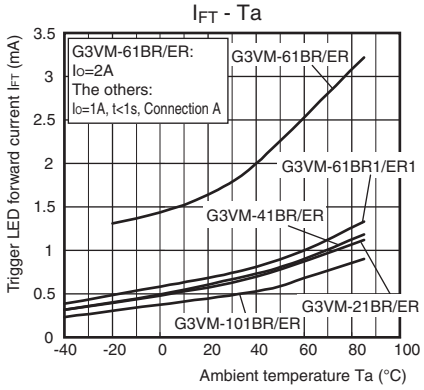


●Trigger LED forward current vs. Ambient temperature

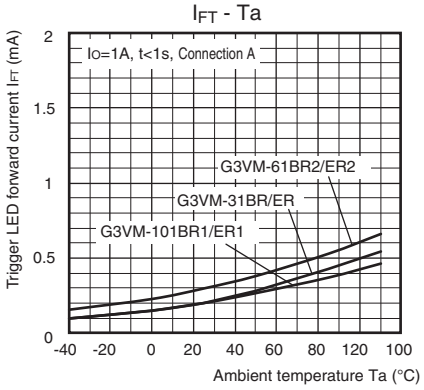
G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1



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

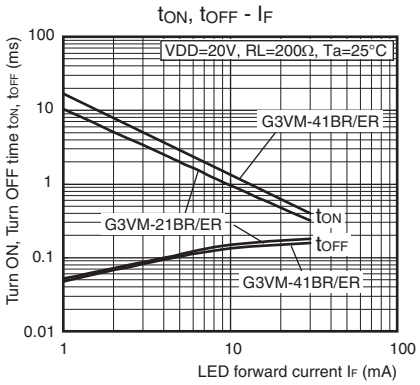


G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1

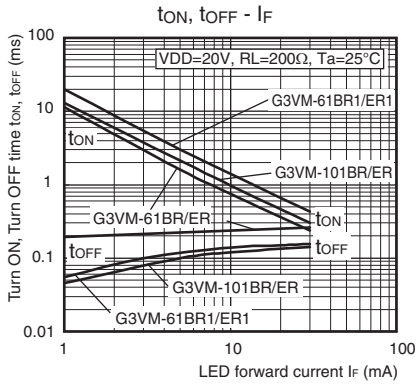


●Turn ON, Turn OFF time vs. LED forward current

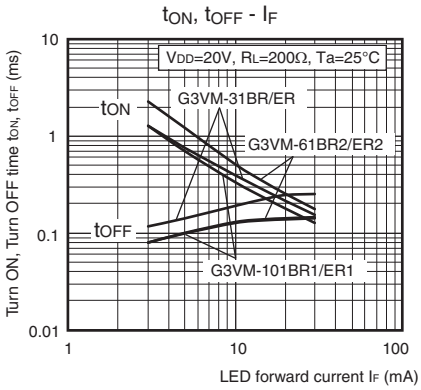
G3VM-21BR/21ER/41BR/41ER



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



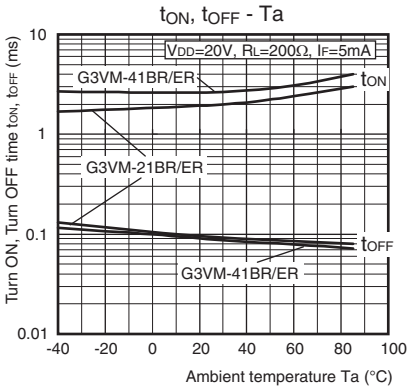
G3VM-31BR/31ER/61BR2/61ER2/101BR1/101ER1



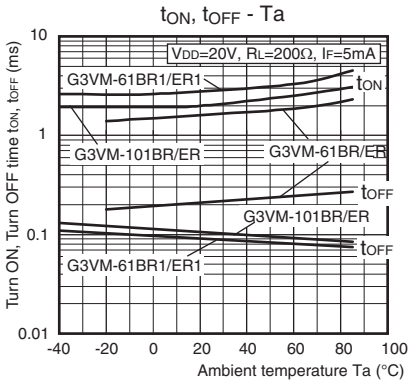
■Engineering Data

● Turn ON, Turn OFF time vs. Ambient temperature

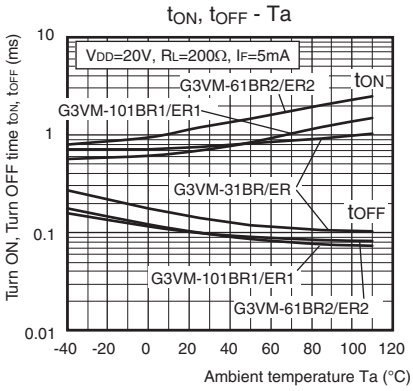
G3VM-21BR/21ER/41BR/41ER



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

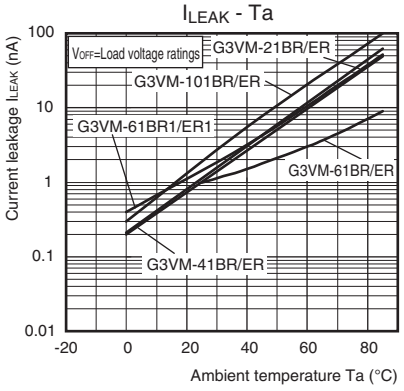


G3VM-31BR/31ER/61BR2/61ER2/ 101BR1/101ER1

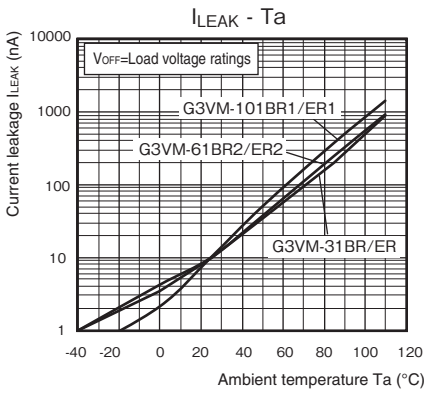


● Current leakage vs. Ambient temperature

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



G3VM-31BR/31ER/61BR2/61ER2/ 101BR1/101ER1



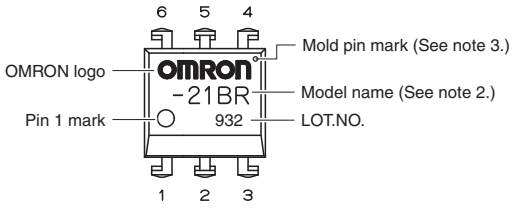
■Appearance / Terminal Arrangement / Internal Connections

●Appearance

DIP (Dual Inline Package)

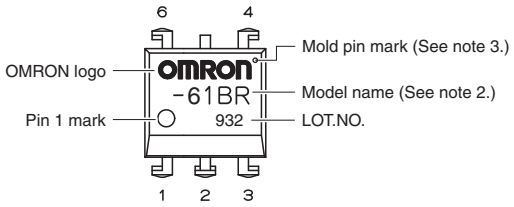
DIP 6-pin

G3VM-21BR/ER, -31BR/ER,-41BR/ER, -61BR1/ER1, -61BR2/ER2, -101BR/ER, -101BR1/ER1



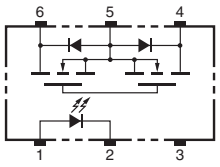
Special DIP 6-pin ✻

G3VM-61BR/ER

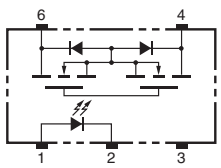


●Terminal Arrangement/Internal Connections (Top View)

G3VM-21BR/ER, -31BR/ER,-41BR/ER, -61BR1/ER1, -61BR2/ER2,-101BR/ER, -101BR1/ER1



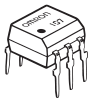
G3VM-61BR/ER



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.

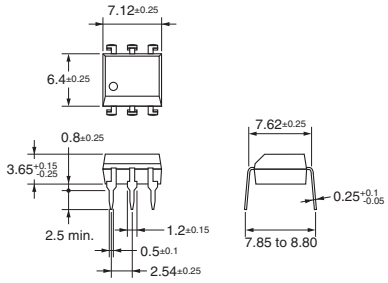
■Dimensions (Unit: mm)

G3VM-21BR/31BR/41BR/61BR1/61BR2/
101BR/101BR1

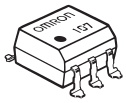


PCB Terminals

Weight: 0.4 g

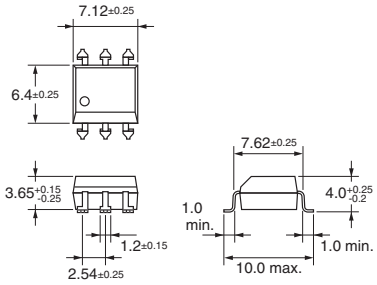


G3VM-21ER/31ER/41ER/61ER1/61ER2/
101ER/101ER1

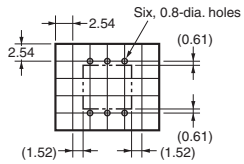


Surface-mounting Terminals

Weight: 0.4 g

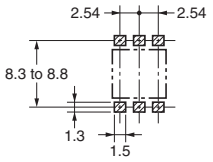


PCB Dimensions (BOTTOM VIEW)



Actual Mounting Pad Dimensions

(Recommended Value, Top View)

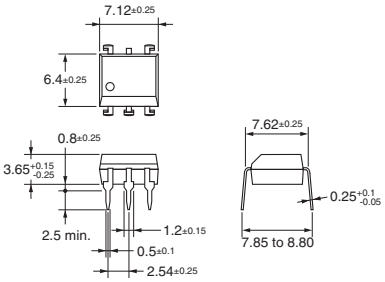


Note: The actual product is marked differently from the image shown here.

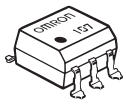
G3VM-61BR

PCB Terminals

Weight: 0.4 g

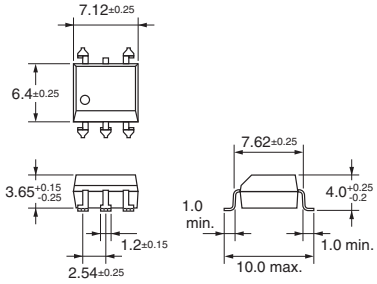


G3VM-61ER

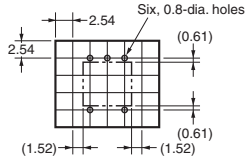


Surface-mounting Terminals

Weight: 0.4 g

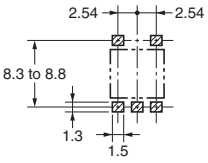


PCB Dimensions (BOTTOM VIEW)



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.

Please check each region's Terms & Conditions by region website.

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