OMRON

A wide range of contact forms and functions
Over 250 different models available

G3VM MOS FET RELAY

Selection Guide

Ultra small outline package "USOP series" expansion
DIP high-capacity & Low ON resistance series expansion
New DIP small series with High Dielectric Strength available

MOS FET Relays
G3VM Series

About MOS FET relays

Omron's Mos Fet Relays lead the industry in Solid State Relay technology, utilizing a LED, PDA and Mos Fet in the load switching current. Our G3VM series of relays offer many benefits including low maintenance costs, small footprint and high-speed switching. As a suitable replacement for a mechanical relay, Mos Fet relays are displacing reed relays as well as relays containing mercury. OMRON has expanded the product lineup by introducing their smallest relay* to date, the new ultra small outline package(USOP) and SSOP which lead the industry in size and performance, with high switching capacity and high sensitivity series available.

*As of September, 2012.

Advantages of MOS FET relays

Ultra small and Weight

Leading the market with substantial space saving offered in our SSOP and new USOP package size

Low driving current

Standard driving current is 2-15mA.
Ultrasensitive type with driving current 1mA(max.) available.

Long operating life

Realize the structure without contacts by sending light signal. Avoid the reduction of life caused by wear of contacts, and realize extended operational life.

Small leakage current

Can withstand external surge current, and not add the snubber circuit. Under normal condition, it is 1 nanometer A or below (GR, LR type), and the leakage current is very small when close.

Excellent shock resistance

All the internal parts use the casting method, and there is not movable part in it, so it has excellent shock resistance and vibration resistance.

High insulation

It turns the voltage into the light, and transfers by the light signal, so it is electrical insulation. It not only can ensure that the Dielectric strength between input and output under normal condition is AC 2500V, but also realizes the serialization of upper 5000V product at the same time, and realize the high insulation.

Silent operation

Avoid the switching voice caused by metal contacts of mechanical relay. Realize the function of silence.

High-speed switching

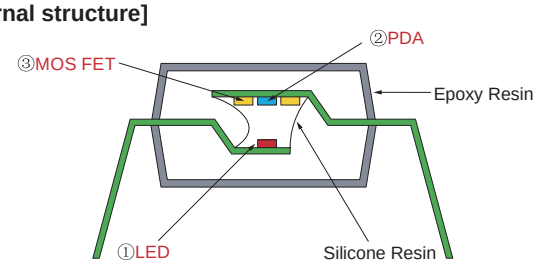
Comparing with the switching time of 3 ～ 5ms of mechanical relay, its switching time is shortened to 1ms. Realize the quick response performance.

Control the micro analog signal correctly

Comparing with the triac, it reduces the dead zone greatly. The input waveform of micro analog signal dose not distort basically and is converted into output waveform without distortion.

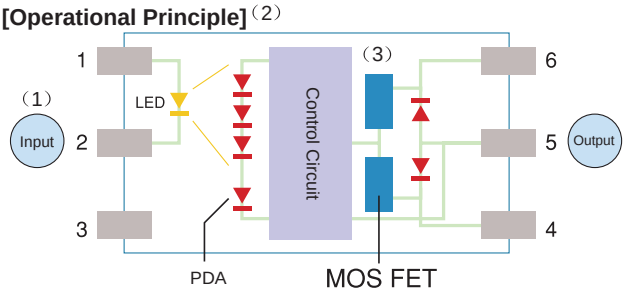
Structure and operational principle of MOS FET relays

[Internal structure]



MOS FET relay consists of the following three components:
①LED (light emitting diode)
②Photodiode dome array (PDA)
③MOS FET

[Operational Principle]（2）

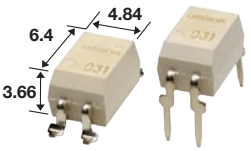


（1）The LED lights when the current is connected at the input side.
（2）The light sent by the LED will be converted into voltage again when it is received by the photodiode.
（3）This voltage will be a gate voltage to drive MOS FET via control circuit.

Package of MOS FET Relays

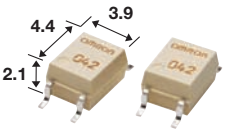
DIP

■Bottom surface 100%



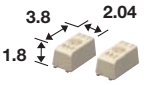
SOP

■Bottom surface 59%



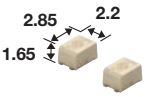
SSOP

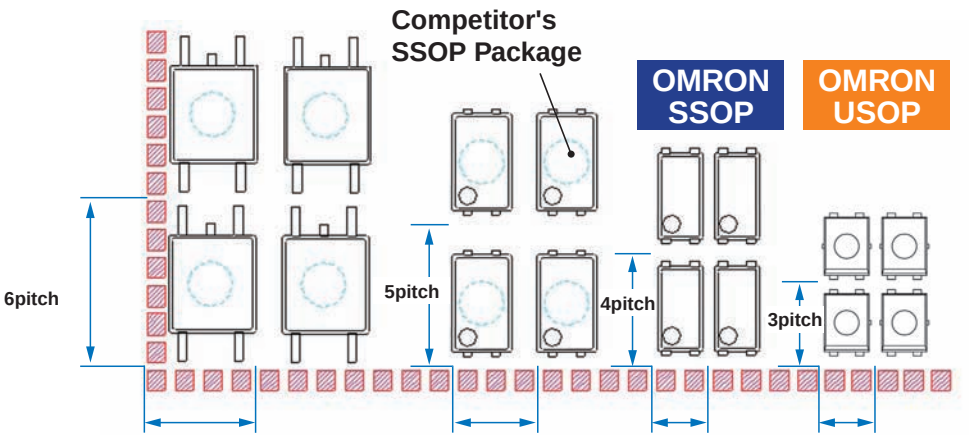
■Bottom surface 19%

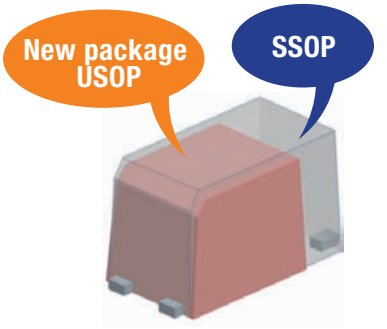


USOP

■Bottom surface 16%







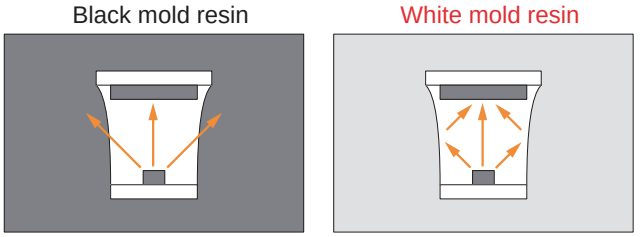
Omron's SSOP leads the industry in size* and performance.
New ultra small outline package USOP availabe !

*As of September, 2012.

Features of Omron's technology

1. White Mold

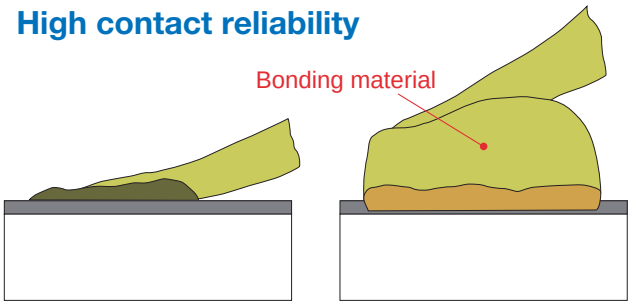
High efficient light conductivity



Black mold: only can receive the direct light from LED
White mold: can receive the indirect reflecting light from both LED and resin

2. BWB Bonding

High contact reliability



OMRON uses more bonding material than that used by other manufacturers; in an effort to improve the contact reliability.

MOS FET Relay Lineup

High Current & Low On-resistance Type

Ideal for power circuit with high current and low on-resistance


DIP4 DIP6 SOP4 SOP6

Package	Model	Load Voltage(V) Max.	Continuous load current (mA) Max.	Typical ON resistance(Ω)
DIP	G3VM-21AR/DR NEW	20	3	0.04
	G3VM-21BR/ER NEW	20	4(8)*	0.02(0.005)*
	G3VM-41AR/DR NEW	40	2.5	0.05
	G3VM-41BR/ER NEW	40	3.5(7)*	0.03(0.008)*
	G3VM-61AR/DR NEW	60	2	0.08
	G3VM-61BR/ER	60	2.5	0.065
	G3VM-61BR1/ER1 NEW	60	3(6)*	0.04(0.01)*
	G3VM-101AR/DR NEW	100	1	0.25
	G3VM-101BR/ER NEW	100	2(4)*	0.1(0.025)*
SOP	G3VM-21HR	20	2.5(5)*	0.02(0.005)*
	G3VM-41GR8	40	1	0.1
	G3VM-41HR NEW	40	2.5(5)*	0.03(0.008)*
	G3VM-61GR1	60	1	0.25
	G3VM-61HR NEW	60	2.3(4.6)*	0.04(0.01)*
	G3VM-81HR	80	1.25(2.5)*	0.11(0.03)*
	G3VM-101HR NEW	100	1.4(2.8)*	0.1(0.025)*

*( )=C-connection

New Ultra Small Outline Package USOP Type

USOP with low C (capacity between terminals) × R (output on-resistance)


USOP

Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Capacity between terminals (pF) Typ.
G3VM-21PR10 NEW	20	200	3	0.8
G3VM-21PR11 NEW	20	900	0.18	40
G3VM-41PR12 NEW	40	100	15	0.3
G3VM-41PR10 NEW	40	120	12	0.45
G3VM-41PR11 NEW	40	140	7	0.7
G3VM-51PR NEW	50	300	1	12
G3VM-61PR1 NEW	60	120	10	0.7
G3VM-61PR NEW	60	400	1	20

Small & High Dielectric Strength Type

Dielectric Strength between I/O 5,000Vrms with small DIP4.
Low Power Consumption at 2mA (maximum) driving current*.
*Driving current=Trigger LED forward current

Model	Load Voltage(V) Max.	Continuous load current (mA) Max.	Maximum Trigger LED forward current (mA)	Dielectric strength between input and output (Vrms) Max.
G3VM-41AY/DY NEW	40	2000	2	5000
G3VM-61AY/DY NEW	60	500	2	5000
G3VM-201AY/DY NEW	200	250	2	5000
G3VM-351AY/DY NEW	350	100	2	5000
G3VM-401AY/DY NEW	400	120	2	5000
G3VM-601AY/DY NEW	600	90	2	5000

Ultrasensitive Type

Ideal for power saving with a driving current* 1mA(maximum)

*Driving current=Trigger LED forward current

Model	Load Voltage(V) Max.	Continuous load current (mA) Max.	Maximum Trigger LED forward current (mA)	Operating LED forward current (mA)
G3VM-61G2	60	400	1	2
G3VM-201G1	200	200	1	2
G3VM-351G1	350	100	1	2
G3VM-601G	600	90	1	2

Low Capacity between terminals & Low On-resistance Type (Low C × R)

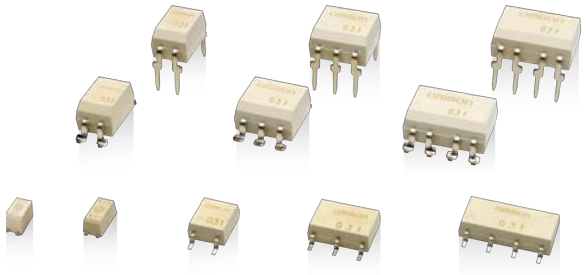
Ideal for semi-conductor test equipment.
low C(capacity between terminals) × R(output on-resistance) type

SOP package

Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Capacity between terminals (pF) Typ.
G3VM-21GR	20	160	5	1
G3VM-21GR1	20	300	1	5
G3VM-41GR4	40	250	2	5
G3VM-41GR5	40	300	1	10
G3VM-41GR6	40	120	10	1
G3VM-81GR	80	40	16	2.5
G3VM-81GR1	80	200	5	6.5

SSOP package

Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Capacity between terminals (pF) Typ.
G3VM-21LR	20	160	5	1
G3VM-21LR1	20	450	0.8	5
G3VM-21LR10	20	200	3	0.8
G3VM-41LR4	40	250	2	5
G3VM-41LR5	40	300	1	10
G3VM-41LR6	40	120	10	1
G3VM-41LR10	40	120	12	0.45
G3VM-41LR11	40	140	7	0.7



Product lineup of MOS FET Relays

DIP(Dual Inline Package)

Load Voltage(V) Max.	Model	Number of terminals	Contact form	Continuous load current (mA) Max.	Typical ON resistance(Ω)	Maximum turn-ON time (ms)	Maximum turn-OFF time (ms)	Dielectric strength between input and output (Vrms) Max.
20	G3VM-21AR/DR NEW	4	1a	3000	0.04	5.0	1.0	2500
20	G3VM-21BR/ER NEW	6	1a	4000	0.02	5.0	1.0	2500
40	G3VM-41AY/DY NEW	4	1a	2000	0.09*	5.0	1.0	5000
40	G3VM-41AR/DR NEW	4	1a	2500	0.05	5.0	1.0	2500
40	G3VM-41BR/ER NEW	6	1a	3500	0.03	5.0	1.0	2500
60	G3VM-61A1/D1	4	1a	500	1	2.0	0.5	2500
60	G3VM-61AY/DY NEW	4	1a	500	0.6	1.0	1.0	5000
60	G3VM-61AR/DR NEW	4	1a	2000	0.08	5.0	1.0	2500
60	G3VM-61B1/E1	6	1a	500	1	2.0	0.5	2500
60	G3VM-61BR/ER	6	1a	2500	0.065	1.5	0.4	2500
60	G3VM-61BR1/ER1 NEW	6	1a	3000	0.04	5.0	1.0	2500
60	G3VM-62C1/F1	8	2a	500	1	2.0	0.5	2500
100	G3VM-101AR/DR NEW	4	1a	1000	0.25	5.0	1.0	2500
100	G3VM-101BR/ER NEW	6	1a	2000	0.1	5.0	1.0	2500
200	G3VM-201AY/DY NEW	4	1a	250	5	1.0	1.0	5000
350	G3VM-351AY/DY NEW	4	1a	100	35*	1.0	1.0	5000
350	G3VM-2L/2FL	4	1a	120	22	1.0	1.0	2500
350	G3VM-351A/D	4	1a	120	35*	1.0	1.0	2500
350	G3VM-351B/E	6	1a	120	35	1.0	1.0	2500
350	G3VM-352C/F	8	2a	120	35*	1.0	1.0	2500
350	G3VM-WL/WFL	8	2a	120	22	1.0	1.0	2500
350	G3VM-353A/D	4	1b	150	15	1.0	3.0	2500
350	G3VM-353B/E	6	1b	150	15	1.0	3.0	2500
350	G3VM-354C/F	8	2b	150	15	1.0	1.0	2500
350	G3VM-355CR/FR	8	1a1b	120	15	1.0	3.0	2500
400	G3VM-401A/D	4	1a	120	18	1.0	1.0	2500
400	G3VM-401AY/DY NEW	4	1a	120	22*	1.0	1.0	5000
400	G3VM-401B/E	6	1a	120	17	1.0	1.0	2500
400	G3VM-401BY/EY	6	1a	120	17	1.0	1.0	5000
400	G3VM-402C/F	8	2a	120	18	1.0	1.0	2500
600	G3VM-601AY/DY NEW	4	1a	90	45*	1.0	1.0	5000
600	G3VM-601BY/EY	6	1a	100	30	1.5	1.0	5000

*On-resistance when saturated

SOP(Small Outline Package)

Load Voltage(V) Max.	Model	Number of terminals	Contact form	Continuous load current (mA) Max.	Typical ON resistance(Ω)	Maximum turn-ON time (ms)	Maximum turn-OFF time (ms)	Dielectric strength between input and output (Vrms) Max.
20	G3VM-21GR	4	1a	160	5	0.5	0.5	1500
20	G3VM-21GR1	4	1a	300	1	0.5	0.5	1500
20	G3VM-21HR	6	1a	2500	0.02	5.0	1.0	1500
40	G3VM-41GR4	4	1a	250	2	0.5	0.5	1500
40	G3VM-41GR5	4	1a	300	1	0.5	0.5	1500
40	G3VM-41GR6	4	1a	120	10	0.5	0.5	1500
40	G3VM-41GR8	4	1a	1000	0.1	3.0	0.5	1500
40	G3VM-41HR NEW	6	1a	2500	0.03	5.0	1.0	1500
60	G3VM-61VY NEW	4	1a	70	25	5.0	5.0	3750
60	G3VM-61G1	4	1a	400	1	2.0	0.5	1500
60	G3VM-61G2	4	1a	400	1	8.0	3.0	1500
60	G3VM-61GR1	4	1a	1000	0.25	3.0	1.0	1500
60	G3VM-61H1	6	1a	400	1	2.0	0.5	1500
60	G3VM-61HR NEW	6	1a	2300	0.04	5.0	1.0	1500
60	G3VM-62J1	8	2a	400	1	2.0	0.5	1500
80	G3VM-81G1	4	1a	350	1	0.5	0.5	1500
80	G3VM-81GR	4	1a	40	16	0.5	0.5	1500
80	G3VM-81GR1	4	1a	200	5	0.5	0.5	1500
80	G3VM-81HR	6	1a	1250	0.11	3.0	1.0	1500
100	G3VM-101HR NEW	6	1a	1400	0.1	5.0	1.0	1500
200	G3VM-201G	4	1a	50	40	0.5	0.2	1500
200	G3VM-201G1	4	1a	200	5	8.0	3.0	1500
200	G3VM-S5	4	1a	200	5	1.5	1.0	1500
200	G3VM-201H1	6	1a	200	5	1.5	1.0	1500

*On-resistance when saturated

Product lineup of MOS FET Relays

SOP(Small Outline Package)

Load Voltage(V) Max.	Model	Number of terminals	Contact form	Continuous load current (mA) Max.	Typical ON resistance(Ω)	Maximum turn-ON time (ms)	Maximum turn-OFF time (ms)	Dielectric strength between input and output (Vrms) Max.
200	G3VM-202J1	8	2a	200	5	1.5	1.0	1500
350	G3VM-351G	4	1a	110	35*	1.0	1.0	1500
350	G3VM-351G1	4	1a	100	35	5.0	3.0	1500
350	G3VM-351GL	4	1a	120	15	1.0	1.0	1500
350	G3VM-351H	6	1a	110	35*	1.0	1.0	1500
350	G3VM-352J	8	2a	110	35*	1.0	1.0	1500
350	G3VM-353G	4	1b	120	15	1.0	3.0	1500
350	G3VM-353H	6	1b	120	15	1.0	3.0	1500
350	G3VM-354J	8	2b	120	15	1.0	3.0	1500
350	G3VM-355JR	8	1a1b	120	15	1.0	3.0	1500
400	G3VM-401G	4	1a	120	17	1.0	1.0	1500
400	G3VM-401H	6	1a	120	17	1.0	1.0	1500
400	G3VM-402J	8	2a	120	17	1.0	1.0	1500
600	G3VM-601G	4	1a	90	45	8.0	3.0	1500

*ON registance when it is saturation

SSOP(Shrink Small Outline Package)

Load Voltage(V) Max.	Model	Number of terminals	Contact form	Continuous load current (mA) Max.	Typical ON resistance(Ω)	Maximum turn-ON time (ms)	Maximum turn-OFF time (ms)	Dielectric strength between input and output (Vrms) Max.
20	G3VM-21LR	4	1a	160	5	0.5	0.5	1500
20	G3VM-21LR1	4	1a	450	0.8	0.5	0.5	1500
20	G3VM-21LR10	4	1a	200	3	0.2	0.2	1500
20	G3VM-21LR11	4	1a	900	0.18	2.0	1.0	1500
40	G3VM-41LR4	4	1a	250	2	0.5	0.5	1500
40	G3VM-41LR5	4	1a	300	1	0.5	0.5	1500
40	G3VM-41LR6	4	1a	120	10	0.5	0.5	1500
40	G3VM-41LR10	4	1a	120	12	0.2	0.3	1500
40	G3VM-41LR11	4	1a	140	7	0.2	0.2	1500
60	G3VM-61LR	4	1a	400	1	1.0	1.0	1500
80	G3VM-81LR	4	1a	120	7.5	0.25	0.2	1500
100	G3VM-101LR	4	1a	80	8	0.3	0.3	1500

USOP(Ultra Small Outline Package)

Load Voltage(V) Max.	Model	Number of terminals	Contact form	Continuous load current (mA) Max.	Typical ON resistance(Ω)	Maximum turn-ON time (ms)	Maximum turn-OFF time (ms)	Dielectric strength between input and output (Vrms) Max.
20	G3VM-21PR10 *NEW*	4	1a	200	3	0.2	0.2	500
20	G3VM-21PR11 *NEW*	4	1a	900	0.18	2.0	1.0	500
40	G3VM-41PR12 *NEW*	4	1a	100	15	0.2	0.2	500
40	G3VM-41PR10 *NEW*	4	1a	120	12	0.2	0.3	500
40	G3VM-41PR11 *NEW*	4	1a	140	7	0.2	0.2	500
50	G3VM-51PR *NEW*	4	1a	300	1	0.5	0.4	500
60	G3VM-61PR1 *NEW*	4	1a	120	10	0.2	0.2	500
60	G3VM-61PR *NEW*	4	1a	400	1	0.5	0.5	500

G3VM Model Number Legend

G3VM-□□ □□□□□
① ②③④⑤

①Load voltage

2：20V
4：40V
6：60V
8：80V
10：100V
20：200V
25：250V
35：350V
40：400V
60：600V

② Contact form

1：1a(SPST-NO)
2：2a(DPST-NO)
3：1b(SPST-NC)
4：2b(DPST-NC)
5：1a1b(SPST-NO/SPST-NC)
6：Other form

③ Package type

A：DIP 4pin
B：DIP 6pin
C：DIP 8pin
D：SMD 4pin
E：SMD 6pin
F：SMD 8pin
G：SOP 4pin
H：SOP 6pin
J：SOP 8pin
K：SOP 18pin
L：SSOP 4pin
M：SSOP 6pin
N：SSOP 8pin
P：USOP 4pin
Q：USOP 6pin
R：USOP 8pin
S：SON 4pin
T：SON 6pin
U：SON 8pin
V：SOP 4pin (special)

④ Additional functions

L：Current limit
M：Multi-functional and basic type
N：Multi-function without diode
O：Single input LED type
P：Special pin arrangement
Q：Multfunction with current limiter type
R：Low ON-resistance type
S：Slow input/slow output
T：Multifunction with current limiter and without diode type
Y：Dielectric strength between I/O above 2.5 kV type
F：High switching speed type

⑤ Other information

When specifications overlap, serial code is added in the recorded order.

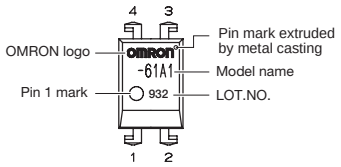
Note 1: Some products may have a different model number structure.
Note 2: In order to avoid the confusion of I (English letter) and 1 (number), I (English letter) are not used here.
Note 3: For 4-pin SOP models, where the available marking space is insufficient to clearly differentiate model numbers with 6 or more suffix digits, the package type code ③ is omitted.

Product lineup of MOS FET Relays

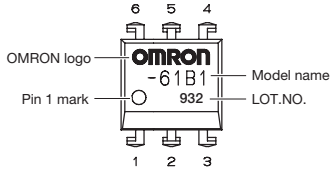
Package

DIP(Dual Inline Package)

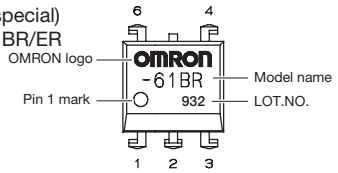
DIP4pin



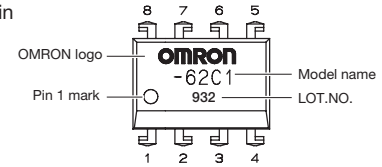
DIP6pin



DIP6pin(special)
G3VM-61BR/ER

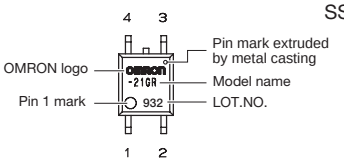


DIP8pin

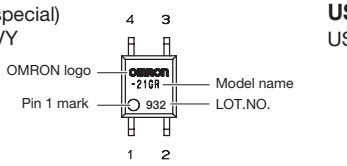


SOP(Small Outline Package)

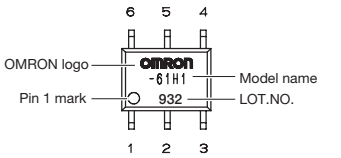
SOP4pin



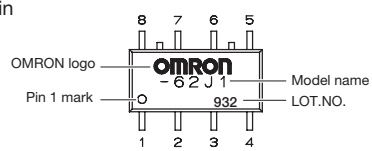
SOP4pin(special)
G3VM-61VY



SOP6pin

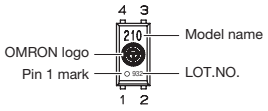


SOP8pin



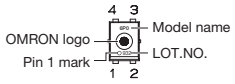
SSOP(Shrink Small Outline Package)

SSOP4pin



USOP(Ultra Small Outline Package)

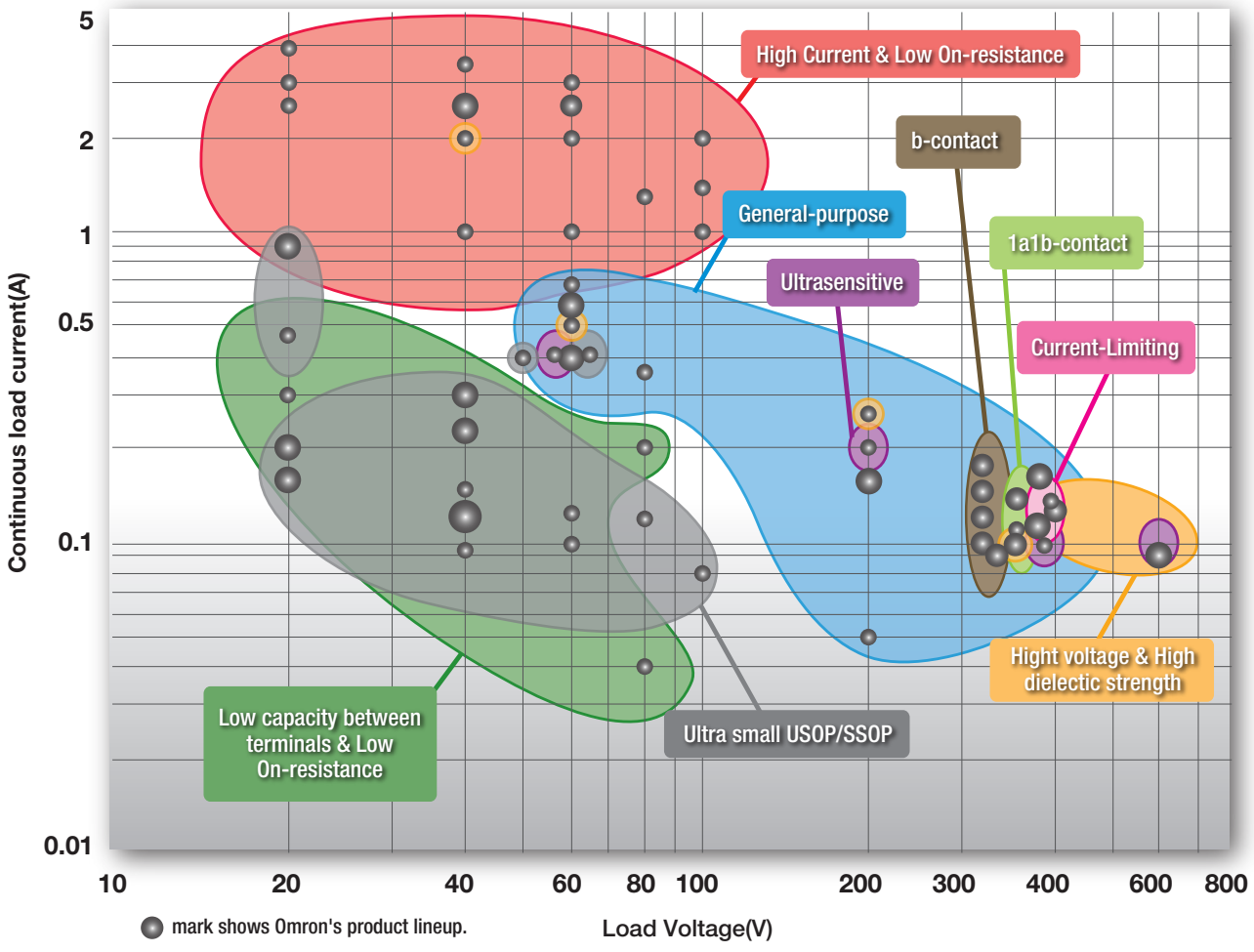
USOP4pin



Note: Model symbol of product does not include "G3VM".

※ 1PIN mark and the dent at the side opposite to the angle are marks extruded by metal casting.

Product Map by features



Target Applications

Communication Equipment

- Modem
- FAX
- Network equipment
- PBX・Transmission equipment

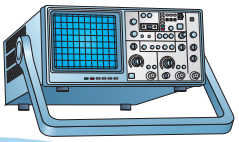
General -purpose/ b-contact type

Recommended products

G3VM-61A1/D1
G3VM-351A/D
G3VM-353A/D

Test and Measurement Equipment

- ATE(Automated test equipment)
- Oscilloscope
- Probe/Load card
- IC tester



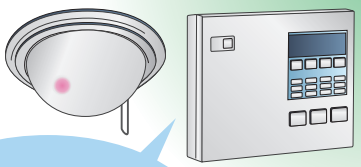
Ultra-small/Low C×R type

Recommended products

G3VM-21GRxx/41GRxx/81GRXX
G3VM-21LRxx/41LRxx/
61LR/81LR/101LR
G3VM-21PRxx/41PRxx/61PRxx

Security Equipment

- Smoke and gas detection equipment
- Household safety panel
- Human detection sensor
- Video intercom



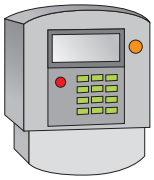
Silent/Ultrasensitive type

Recommended products

G3VM-61G1/G2/VY
G3VM-351G/351G1

Electric Meter

- Electric Meter
- Smart Meter
- Gas Meter



High Dielectric Strength type

Recommended products

G3VM-351AY/DY
G3VM-401AY/DY
G3VM-401BY/EY
G3VM-601AY/DY
G3VM-601BY/DY

There are many other usages beyond the above applications.

Medical Equipment	Broadcasting Equipment	Factory Automation Equipment	FA/Amusement Equipment

For more detailed information, please contact your local Omron Representative.

Note: Do not use this document to operate the Unit.

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AVIC JONHON

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«FORSTAR» (основан в 1998 г.)

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