

OMRON



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

G3VM MOSFET RELAY

Now offering higher load voltages to high switching type
New ultra small outline package "USOP" 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.

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 can carry out half-permanent drive.

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.

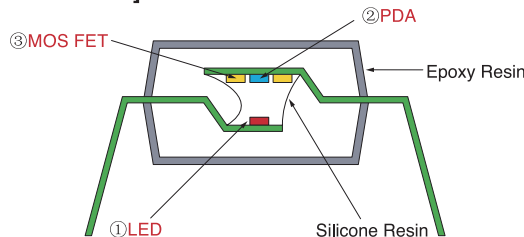
Control the micro analog signal correctly

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

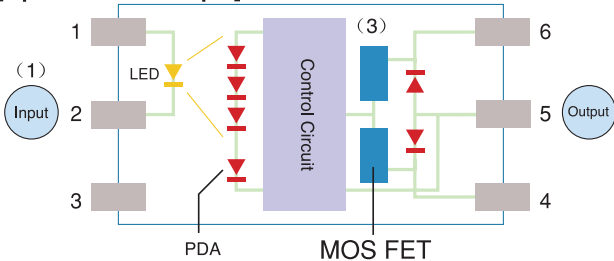
[Internal structure]



MOS FET relay consists of the following three components:

- ①LED (light emitting diode)
- ②Photodiode dome array (PDA)
- ③MOS FET

[Operational Principle] (2)

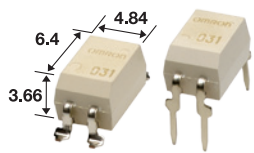


- (1) The LED lights when the current is connected at the input side.
- (2) The light sent by the LED will be converted into voltage again when it is received by the photodiode.
- (3) This voltage will be a gate voltage to drive MOS FET via control circuit.

Package of MOS FET Relays

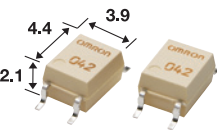
DIP

■ Bottom surface
100%



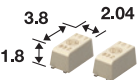
SOP

■ Bottom surface
59%



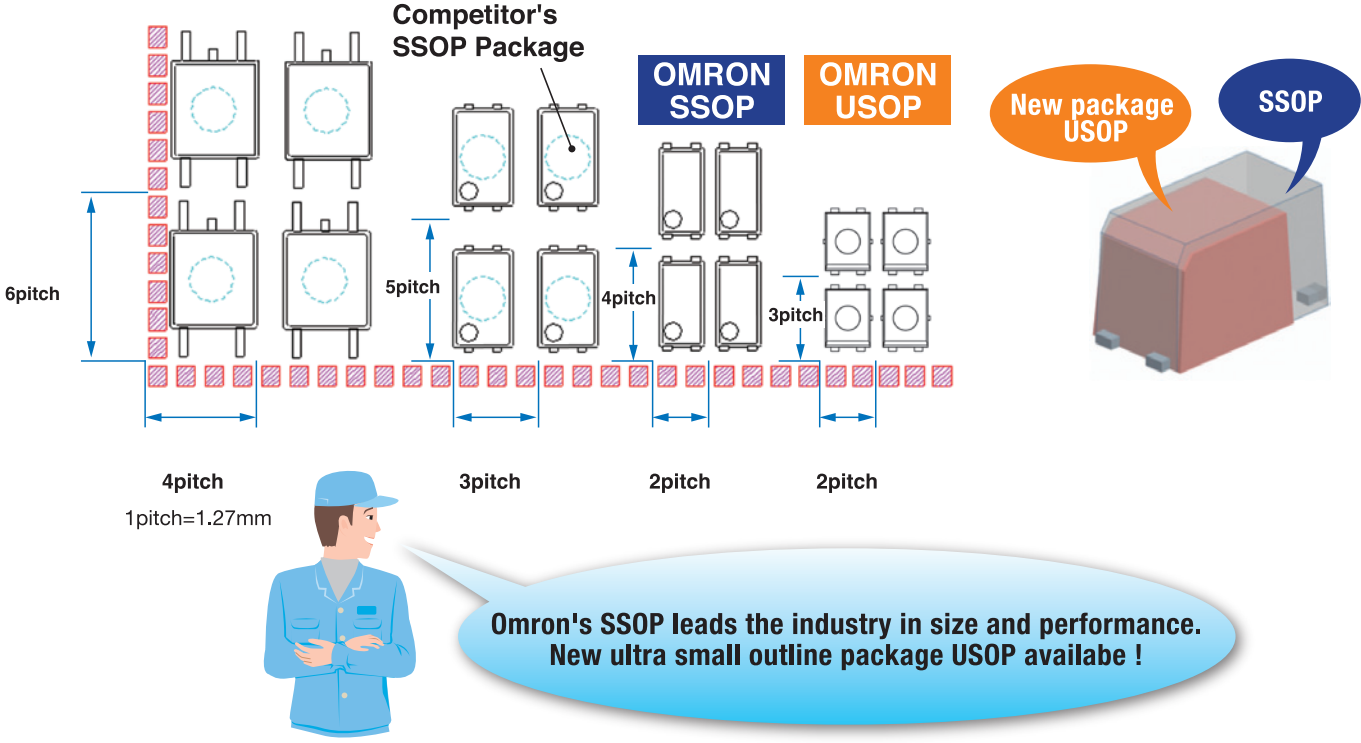
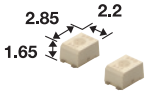
SSOP

■ Bottom surface
19%



USOP

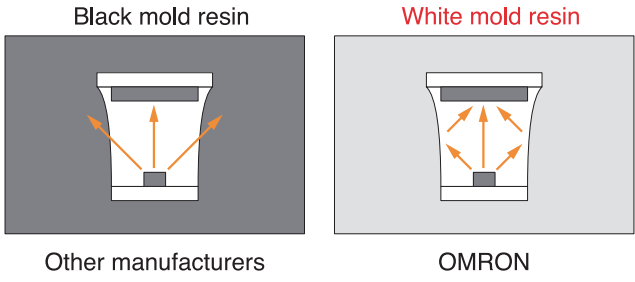
■ Bottom surface
16%



Features of Omron's technology

1. White Mold

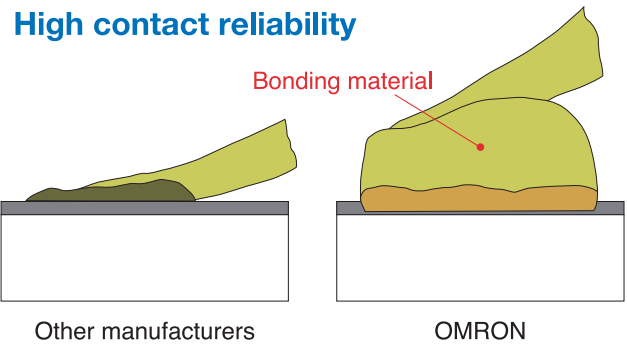
High efficient light conductivity



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

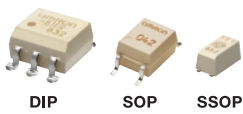


OMRON uses more bonding material than that used by other manufacturers; in an effort to improve the contact reliability.

MOS FET Relay Lineup

High Current & Low On-resistance Type

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



Package	Model	Load Voltage(V) Max.	Continuous load current (mA) Max.	Typical ON resistance(Ω)
DIP	G3VM-61BR/ER	60	2500	0.065
SOP	G3VM-21HR NEW	20	2500(5000)*	0.02(0.005)*
	G3VM-41GR8	40	1000	0.1
	G3VM-41HR NEW	40	2500(5000)*	0.03(0.008)*
	G3VM-61GR1	60	1000	0.25
	G3VM-61HR NEW	60	2300(4600)*	0.04(0.01)*
	G3VM-81HR	80	1250(2500)*	0.11(0.03)*
SSOP	G3VM-101HR NEW	100	1400(2800)*	0.1(0.025)*
	G3VM-21LR11 NEW	20	900	0.18

*()=C-connection

High Dielectric Strength & Low Cost Type

SOP4 pin*(special) with high insulation and low power consumption

*Pin-compatible with standard SOP4



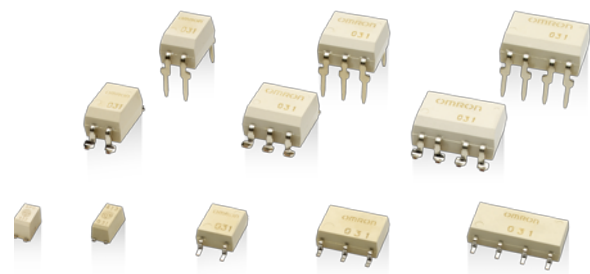
Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Dielectric strength between input and output (Vrms) Max.
G3VM-61VY NEW	60	70	25	3,750

New Ultra Small Outline Package USOP Type

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



Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Capacity between terminals (pF) Typ.
G3VM-61PR NEW	60	400	1	20



Ultrasensitive Type

Ideal for battery driving equipment with a driving current* 1mA(maximum)



Model	Load Voltage(V) Max.	Continuous load current (mA) Max.	Maximum Trigger LED forward current (mA)	Operating LED forward current (mA)
G3VM-61G2 NEW	60	400	1	2
G3VM-201G1 NEW	200	200	1	2
G3VM-351G1 NEW	350	100	1	2
G3VM-601G NEW	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-41GR3	40	80	25	0.6
G3VM-41GR4	40	250	2	5
G3VM-41GR5	40	300	1	10
G3VM-41GR6	40	120	10	1
G3VM-41GR7	40	120	6.5	1.65
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-41LR3	40	80	25	0.6
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

Small & High Load Voltage Type

World's smallest package in SSOP with high load voltage by 100V



Model	Load Voltage(V) Max.	Continuous load current(mA) Max.	Typical ON resistance(Ω)	Capacity between terminals (pF) Typ.
G3VM-61LR	60	400	1	20
G3VM-81LR	80	120	7.5	5
G3VM-101LR	100	80	8	6

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.
60	G3VM-61A1/D1	4	1a	500	1	2.0	0.5	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-62C1/F1	8	2a	500	1	2.0	0.5	2500
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-353A1/D1	4	1b	100	30	0.5	1.0	2500
350	G3VM-353B/E	6	1b	150	15	1.0	3.0	2500
350	G3VM-353B1/E1	6	1b	100	27	0.5	1.0	2500
350	G3VM-354C/F	8	2b	150	15	1.0	3.0	2500
350	G3VM-354C1/F1	8	2b	100	30	0.5	1.0	2500
350	G3VM-355C/F	8	1a1b	100	40	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-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-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-41GR3	4	1a	80	25	0.5	0.5	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-41GR7	4	1a	120	6.5	0.5	0.5	1500
40	G3VM-41GR8	4	1a	1000	0.1	3.0	0.5	1500
40	G3VM-41HR	6	1a	2500	0.03	5.0	1.0	1500
60	G3VM-61VY	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	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	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
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-353G1	4	1b	90	30	1.0	1.0	1500
350	G3VM-353H	6	1b	120	15	1.0	3.0	1500
350	G3VM-353H1	6	1b	90	27	0.5	1.0	1500
350	G3VM-354J	8	2b	120	15	1.0	3.0	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.
350	G3VM-354J1	8	2b	90	30	0.5	1.0	1500
350	G3VM-355J	8	1a1b	90	40	1.0	1.0	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 resistance 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-41LR3	4	1a	80	25	0.5	0.5	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.
60	G3VM-61PR	4	1a	400	1.0	0.5	0.5	500

G3VM Model Number Legend

G3VM- □ □ □ □ □ □

① ② ③ ④ ⑤

① Load voltage	② Contact form	③ Package type	④ Additional functions	⑤ Other information
2: 20V 4: 40V 6: 60V 8: 80V 10: 100V 20: 200V 25: 250V 35: 350V 40: 400V 60: 600V	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	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)	L: Current limit M: Multi-functional and basic type N: Multi-function without diode O: Single input LED type P: Special pin arrangement Q: Multifunction 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	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

OMRON logo
Pin 1 mark
Pin mark extruded by metal casting
Model name
LOT.NO.

SOP(Small Outline Package)
SOP4pin

OMRON logo
Pin 1 mark
Pin mark extruded by metal casting
Model name
LOT.NO.

SSOP(Shrink Small Outline Package)
SSOP4pin

OMRON logo
Model name
LOT.NO.

DIP6pin

OMRON logo
Pin 1 mark
Model name
LOT.NO.

SOP4pin(special)

OMRON logo
Pin 1 mark
Model name
LOT.NO.

USOP(Ultra Small Outline Package)
USOP4pin

OMRON logo
Model name
LOT.NO.

DIP6pin(special)

OMRON logo
Pin 1 mark
Model name
LOT.NO.

SOP6pin

OMRON logo
Pin 1 mark
Model name
LOT.NO.

DIP8pin

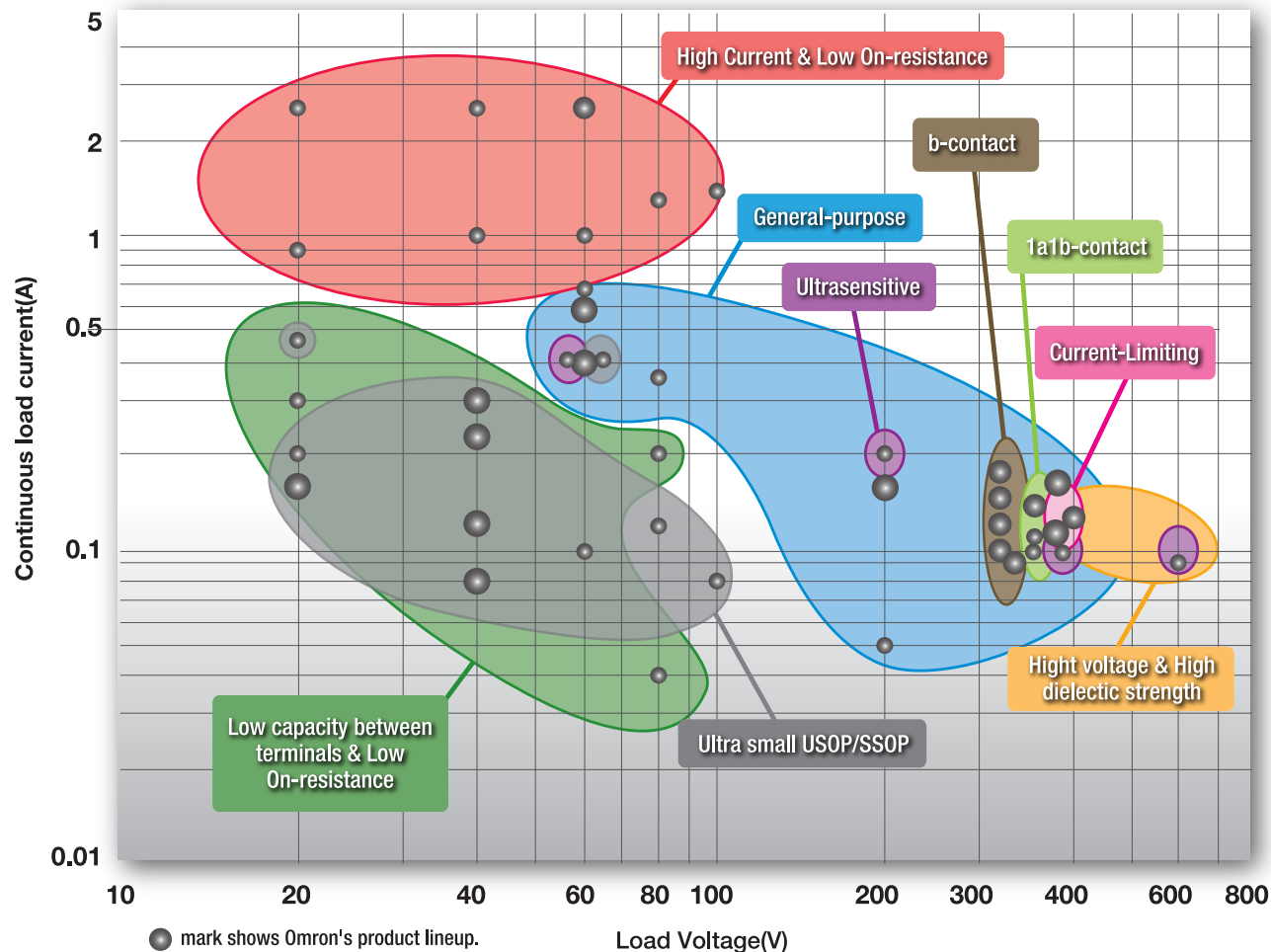
OMRON logo
Pin 1 mark
Model name
LOT.NO.

SOP8pin

OMRON logo
Pin 1 mark
Model name
LOT.NO.

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

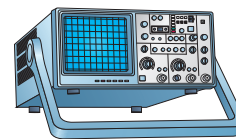


General -purpose/ b-contact type

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

Test and Measurement Equipment

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



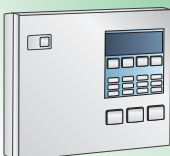
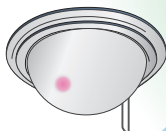
Ultra-small/Low C×R type

Recommended products
G3VM-21GRxx/41GRxx/81GRXX
G3VM-21LRxx/41LRxx/
61LR/81LR/101LR
G3VM-61PR



Security Equipment

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

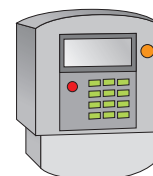


Silent/Ultrasonic type

Recommended products
G3VM-61G1
G3VM-61G2
G3VM-61VY

Electric Meter

- Electric Meter
- Smart Meter
- Gas Meter



High Dielectric Strength type

Recommended products
G3VM-401BY/EY
G3VM-601BY/EY

There are many other usages beyond the above applications.

Medical Equipment

Broadcasting Equipment

Factory Automation Equipment

Amusement Equipment

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

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

OMRON Corporation Electronic and Mechanical Components Company

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