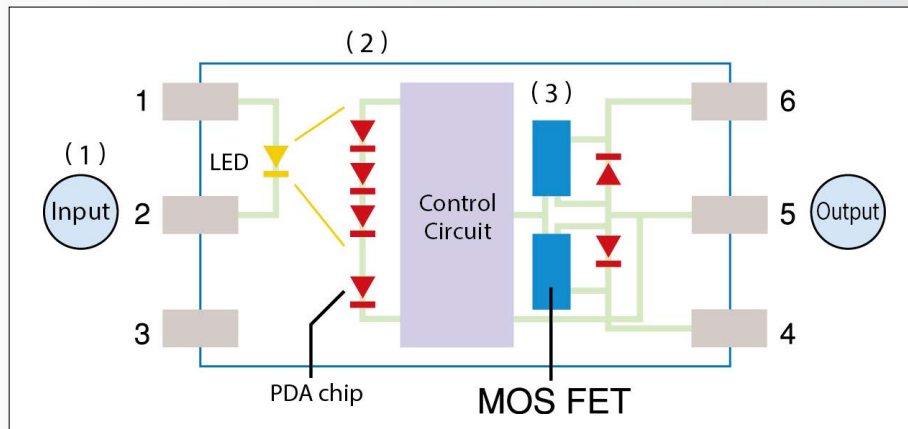


# What is a MOSFET Relay?

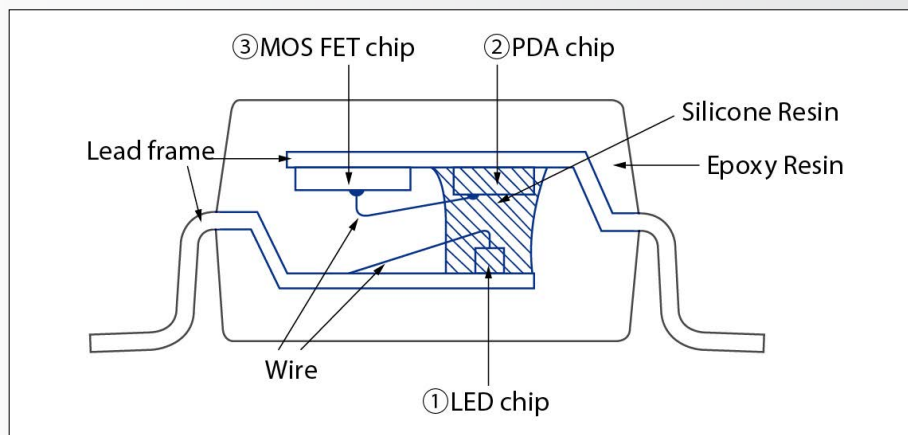
Electronic  
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## MOSFET relay block diagram



## MOSFET relay construction



A MOSFET relay offers superior performance to an electromechanical relay in many applications. It is a solid-state device that replaces a coil-activated mechanical switch with an optically isolated input stage driving a MOSFET.

Internally, a MOSFET relay includes an input-side LED and an output side with a photodiode dome array (PDA), a control circuit, and an output FET block. The operation is as follows:

- (1) The input driver circuit causes current to flow through the LED, turning it on. The driver circuit can be as simple as a pullup resistor on pin 1 and a switch to ground on pin 2.
- (2) The light from the LED output travels through the silicone resin and is converted to voltage by the PDA.
- (3) The PDA output drives the MOSFET output block via a control circuit. The output block contains a double MOSFET, allowing it to pass both AC and DC loads in either direction.

**To find out more about our MOSFET relays,  
please visit our website.**

► **MOSFET Relay Advantages**

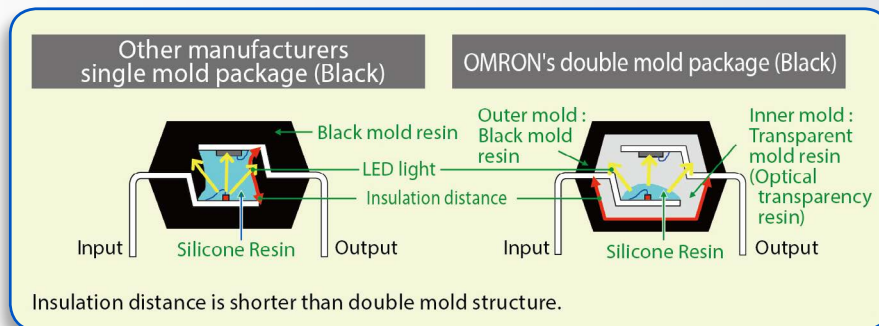
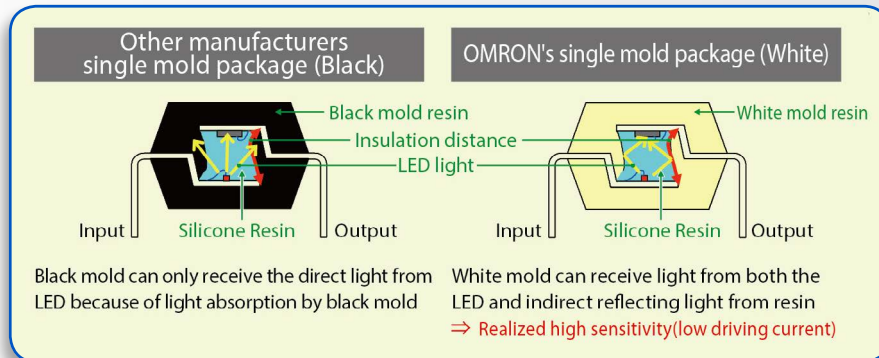
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# MOSFET Relay Advantages



| Technology →<br>Feature ↓            | MOSFET | Thyristor | BJT | Triac |
|--------------------------------------|--------|-----------|-----|-------|
| <b>Hot-switchable</b>                | ✓      | ✗         | ✗   | ✓     |
| <b>Bi-directional</b>                | ✓      | ✗         | ✓   | ✗     |
| <b>Both AC and DC signal support</b> | ✓      | ✓         | ✗   | ✗     |

Compared to traditional relays, MOSFET relays offer many benefits, including lower maintenance costs, a smaller footprint, a longer lifetime (greater than 500 million operations), and higher-speed switching.

MOSFET relays also outperform other electronic technologies such as thyristors, bipolar transistors, and triacs. They have hot-switching capability, are bi-directional, and support both AC and DC waveforms.

Compared to solid-state relays from other manufacturers, OMRON's G3VM relays feature single- (white) and double- (black) mold packages that give the designer the widest choice of high-sensitivity and high-dielectric-strength devices.

► **What is a MOSFET Relay?**

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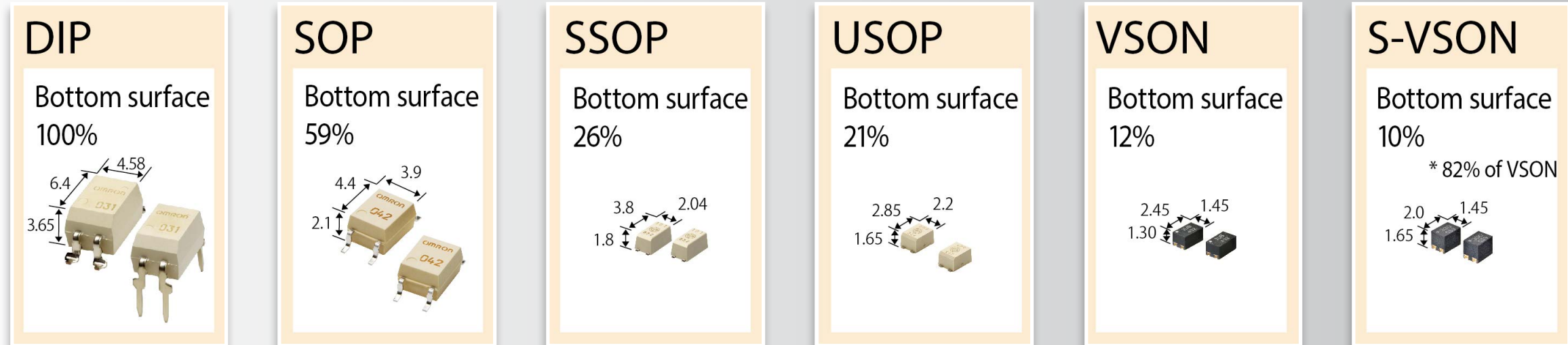
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# Package Information

## Package of MOSFET Relays



**DIP:** Dual Inline Package

**SOP:** Small Outline Package

**SSOP:** Shrink Small Outline Package

**USOP:** Ultra Small Outline Package

**VSON:** Very Small Outline Non-Leaded

**S-VSON:** Super-VSON (smallest package)

► What is a MOSFET Relay?

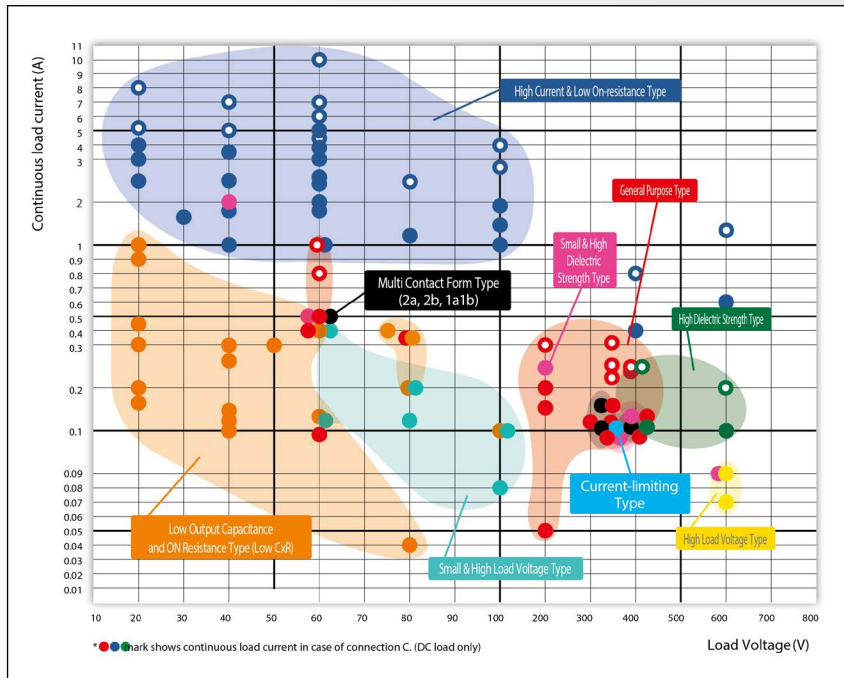
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# Product Lineup



**Please click to view our  
MOSFET relay selection guide**

Omron's G3VM MOSFET relay family includes more than 148 devices that handle a wide range of voltages and currents. Options include current limiting, high-dielectric-voltage withstand, normally open and normally closed contact forms, and high-speed switching.

## Features:

- A wide range of packages: DIP, SOP, SSOP, USOP, VSON, and S-VSON
- S-VSON package is the smallest in the industry: 2 x 1.45 x 1.65 mm
- Single- and dual-contact models available with both NO and NC contacts
- ON-resistance as low as 5 mΩ (typical)
- OFF-state capacitance as low as 0.3 pF (typical)
- Trigger LED forward currents as low as 0.2 mA
- Switching times down to 0.2 ms
- Models including current limiting functions also available
- 100,000 hours of continuous operation
- Dielectric strength up to 5,000 Vac for 1 second
- Models switching up to 10 A\* in such a small package



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# Industries and Applications

## OMRON MOSFET relays are ideal for a wide range of applications:

- Automated test equipment
- Medical equipment
- Instrumentation
- Security equipment
- Automated meter reading
- Automotive diagnostic equipment
- Gaming machines
- Vending machines
- Factory Automation
- Industrial Equipment
  - Line switching
  - Signal transmission control
- Networking
  - Local area networks (LANs)
  - Routers

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### FA/Industrial Equipment


● Machine tool/ Customized power supply Factory automation (PLC/Thermostat/Timer)



| Function  | Features                 | Recommended products  |
|---|--------------------------|---|
| Status output<br>Signal output                              | General purpose          | G3VM-61G1/VY1/VY2<br>G3VM-351G/351VY<br>G3VM-351A/D                 |
| Switching power supply of small solenoid valve, small motor | High current             | G3VM-41GR8/61GR□<br>G3VM-□BR/DR<br>G3VM-□CR□/□FR□<br>G3VM-□HR/61HR1 |
| External output   | High dielectric strength | G3VM-□AY/DY/AY1/DY1   |

### Test & Measurement Equipment


● Semi-conductor test equipment(ATE)/  
Semi-conductor test equipment Interface board/  
Oscilloscope/Data logger/ I/O board



| Function               | Features     | Recommended products                                       |
|------------------------|--------------|--|
| Switching test signal  | Low CxR      | G3VM-□GR□<br>G3VM-□LR□/□PR□/□UR□/□QR                       |
| Switching power supply | High current | G3VM-41GR8/61GR□<br>G3VM-21LR11/21PR11/21UR11<br>G3VM-31QR |

### Security Equipment


● Smoke detector/Home security panel/PIR/  
Video intercom systems



| Function  | Features                 | Recommended products  |
|---|--------------------------|---|
| Status output<br>Signal output                              | General purpose          | G3VM-61G1/VY1/VY2<br>G3VM-351G/351VY                                |
|   | High sensitivity         | G3VM-61G2/G3<br>G3VM-351G1/G2                                       |
|   | b contact                | G3VM-63G/353G   |
| Switching power supply of small solenoid valve, small light | High current             | G3VM-41GR8/61GR□<br>G3VM-□BR/DR<br>G3VM-□CR□/□FR□<br>G3VM-□HR/61HR1 |
| External output   | High dielectric strength | G3VM-□AY/DY/AY1/DY1   |

### Amusement Equipment

● Currency Sensing Modules  
Coin dispenser / Information system



| Function                       | Features        | Recommended products  |
|--------------------------------|-----------------|---|
| Status output<br>Signal output | General purpose | G3VM-61A1/D1<br>G3VM-61G1/VY1/VY2<br>G3VM-351A/D<br>G3VM-351G/351VY |
|                                | b contact       | G3VM-63G/353G   |

Medical Equipment

Office automation/AV Equipment

Broadcasting Equipment

Communication Equipment

There are many other usages beyond the above applications.

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For over 80 years, Omron Electronic Components has been a leading manufacturer and provider of advanced electronic components. Extensive product groups include relays, switches, connectors, MEMS flow sensors, pressure sensors, and optical components. Omron Electronic Components is the Americas subsidiary of Omron Corporation, a \$7+ billion global leading supplier of electronics and control system components and services. Omron's broad product offering can be found in applications for the communications, transportation, medical, HVAC, appliance, industrial automation, consumer electronics, test and measurement, and gaming markets around the world. Omron Electronic Components has an extensive sales network consisting of regional sales professionals, inside sales representatives, technical sales assistants, customer service staff, and an authorized distributor network.

**For more information, email us at [components@omron.com](mailto:components@omron.com), call us at (847) 882-2288, or visit us online at [components.omron.com](http://components.omron.com).**

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## Links

### PRODUCT INFORMATION:

- ▶ [G3VM MOSFET Relays Technical Information](#)
- ▶ [G3VM MOSFET Relays Selection Guide](#)
- ▶ [OMRON MOSFET Relays Homepage](#)
- ▶ [G3VM MOSFET VSON Relay Video](#)

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