

# OKI electronic components

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## OCMS2□6 SERIES

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### General-purpose SOP Type Optical MOS Relay For AC/DC Load

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#### GENERAL DESCRIPTION

The OCMS2□6 series is a family of optical MOS relays for AC/DC load. The input portion is an infrared light emitting diode. The output portion uses a combination of VD-MOS (Vertical Diffusion MOS) FETs and photodiode arrays. The device is encased in an extremely small 6-pin plastic SOP type package.

The series reduced its area to 50% and its volume to 27% of the conventional DIP or SMD-type optical MOS relays.

The series is 2.1mm thick and is ideal for modem card applications.

The optical MOS relay switch may be used in applications that currently use mechanical relay switches, but offers smaller size, noise-free switching, and electronic circuit compatibility because of its non-mechanical operation. Optical MOS relay switches also dissipate less power than equivalent bipolar devices at lower switching frequencies.

#### FEATURES

- Extremely low voltage control
- Thickness of 2.1mm
- High reliability due to non-contact and optical operation
- No chattering or switch bounces
- No mechanical switching noises
- Small size and easy mounting (6-pin plastic SOP package)

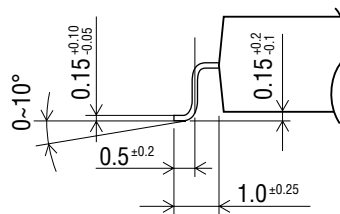
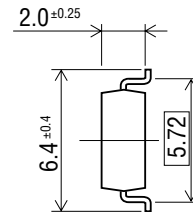
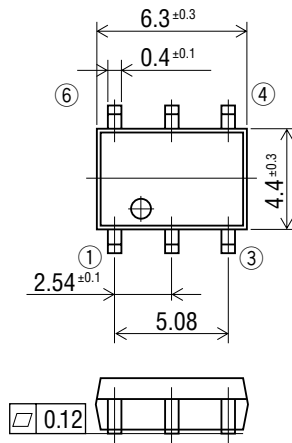
#### APPLICATIONS

- Telecommunications system (such as modem cards)
- Measurement equipment
- Home electronics
- Automatic meter reading equipment
- Other applications requiring small size or high performance
- Other applications requiring non-contact switches

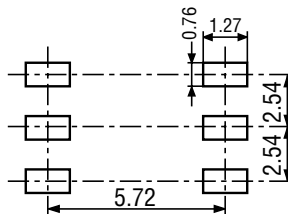
## PIN CONFIGURATION

(Unit: mm)

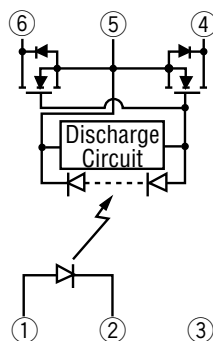
- 6pin SOP Type



- Mounting pad (Top view)



- Pin Connection Diagram



- |            |           |
|------------|-----------|
| 1: Anode   | (LED)     |
| 2: Cathode | (LED)     |
| 3: NC      |           |
| 4: Drain   | (MOS FET) |
| 5: Source  | (MOS FET) |
| 6: Drain   | (MOS FET) |

## ABSOLUTE MAXIMUM RATINGS

(Ambient temperature Ta=25°C)

| Product Name            |                                               |                 |                                        |           | OCMS206                                                                          | OCMS216 | OCMS226 | OCMS236 | OCMS246     |
|-------------------------|-----------------------------------------------|-----------------|----------------------------------------|-----------|----------------------------------------------------------------------------------|---------|---------|---------|-------------|
| Parameter               | Symbol                                        | Condition       | Unit                                   |           |                                                                                  |         |         |         |             |
| Input Characteristics   | Continuous Forward Current                    | $I_F$           |                                        | mA        | 50                                                                               |         |         |         |             |
|                         | Derating Factor of Continuous Forward Current | $\Delta I_F$    |                                        | mA/°C     | Refer to [Derating Factor of Continuous Forward Current] of characteristics data |         |         |         |             |
|                         | Peak Forward Current                          | $I_{FM}$        | Pulse width 100 $\mu$ s<br>Cycle 10 ms | A         | 0.5                                                                              |         |         |         |             |
|                         | Reverse Voltage                               | $V_R$           |                                        | V         | 5                                                                                |         |         |         |             |
|                         | Power Dissipation                             | $P_{DL}$        |                                        | mW        | 75                                                                               |         |         |         |             |
| Output Characteristics  | Load Voltage                                  | $V_{OFF}$       |                                        | V         | 60                                                                               | 100     | 200     | 350     | 400         |
|                         | Load Current                                  | $I_{ON}$        |                                        | mA        | 320                                                                              | 280     | 180     | 120     | 100         |
|                         | Derating Factor of Load Current               | $\Delta I_{ON}$ |                                        | mA/°C     | Refer to [Derating Factor of Load Current] of characteristics data               |         |         |         |             |
|                         | Surge Load Current                            | $I_{SUG}$       | Pulse width 1 ms<br>1shot              | A         | 1.0                                                                              |         |         | 0.8     | 0.7         |
|                         | Power Dissipation                             | $P_D$           |                                        | mW        | 300                                                                              |         |         |         |             |
| Total Power Dissipation |                                               |                 |                                        | $P_{tot}$ |                                                                                  |         |         |         | 325         |
| Isolation Voltage       |                                               |                 |                                        | $V_{IO}$  |                                                                                  |         |         |         | 1500        |
| Operating Temperature   |                                               |                 |                                        | $T_{opr}$ |                                                                                  |         |         |         | -40 to +85  |
| Storage Temperature     |                                               |                 |                                        | $T_{stg}$ |                                                                                  |         |         |         | -40 to +100 |

## ELECTRICAL CHARACTERISTICS

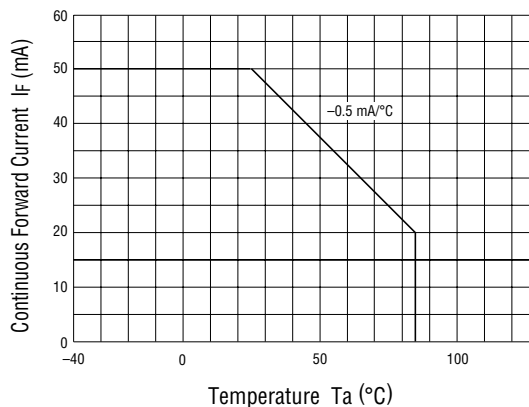
(Ambient temperature Ta=25°C)

| Product Name             |                             |                  |                                                                                   |      | OCMS206 | OCMS216 | OCMS226 | OCMS236 | OCMS246 |     |
|--------------------------|-----------------------------|------------------|-----------------------------------------------------------------------------------|------|---------|---------|---------|---------|---------|-----|
| Parameter                | Symbol                      | Condition        | Unit                                                                              |      |         |         |         |         |         |     |
| Input Characteristics    | Forward Voltage             | V <sub>F</sub>   | I <sub>F</sub> =10 mA                                                             | Min. | 1.0     |         |         |         |         |     |
|                          |                             |                  |                                                                                   | Max. |         |         |         |         |         | 1.3 |
|                          | Reverse Voltage             | I <sub>R</sub>   | V <sub>R</sub> =5 V                                                               | Max. | μA      | 10      |         |         |         |     |
|                          | Operation Input Current *1  | I <sub>FA</sub>  | I <sub>ON</sub> =100 mA                                                           | Max. | mA      | 5       |         |         |         |     |
|                          | Recovery Input Current      | I <sub>FR</sub>  | V <sub>OFF</sub> =Rating<br>I <sub>ON</sub> =100 μA                               | Min. | mA      | 0.2     |         |         |         |     |
| Output Characteristics   | On-resistance               | R <sub>ON</sub>  | I <sub>F</sub> =10 mA                                                             | Min. | Ω       | 1.0     | 2.0     | 4.0     | 7.0     | 10  |
|                          |                             |                  | I <sub>ON</sub> =100 mA                                                           | Typ. |         | 2.0     | 3.0     | 7.0     | 17      | 22  |
|                          |                             |                  | Time to flow current is within one second                                         | Max. |         | 3.0     | 4.0     | 10      | 24      | 33  |
|                          | Off-state Leakage Current*2 | I <sub>OFF</sub> | V <sub>OFF</sub> =Rating                                                          | Max. | μA      | 1.0     |         |         |         |     |
|                          | Output Terminal Capacitance | C <sub>OUT</sub> | V <sub>OFF</sub> =50 V<br>f=1 MHz                                                 | Typ. | pF      | 35      | 25      | 15      | 12      | 10  |
| Coupling Characteristics | Input-to-output Capacitance | C <sub>IO</sub>  | f=1 MHz                                                                           | Typ. | pF      | 1.3     |         |         |         |     |
|                          | Turn-on Time *3             | t <sub>ON</sub>  | I <sub>F</sub> =10 mA<br>I <sub>on</sub> =100 mA<br>OCMS206<br>OCMS216<br>OCMS226 | Typ. | ms      | 0.3     |         |         |         |     |
|                          |                             |                  |                                                                                   | Max. |         | 1.0     |         |         |         |     |
|                          | Turn-off Time *3            | t <sub>OFF</sub> | I <sub>off</sub> =50 mA<br>OCMS236<br>OCMS246                                     | Typ. | ms      | 0.2     |         |         |         |     |
|                          |                             |                  |                                                                                   | Max. |         | 1.0     |         |         |         |     |

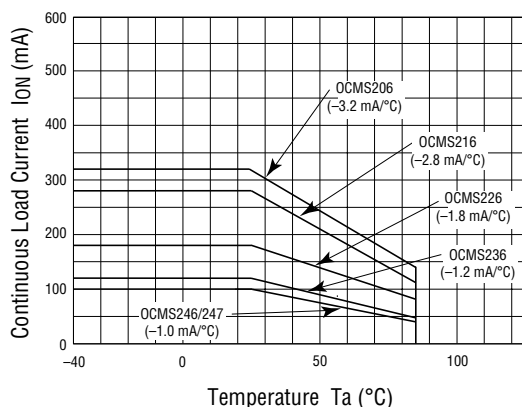
\*1: Can correspond to special specification  $I_{FA}<3.0\text{ mA}$ \*2: Can correspond to special specification  $I_{OFF}<1.0\text{ nA}$ \*3: Can correspond to special specification  $t_{ON} / t_{OFF}<0.5\text{ ms}$

## TYPICAL CHARACTERISTICS

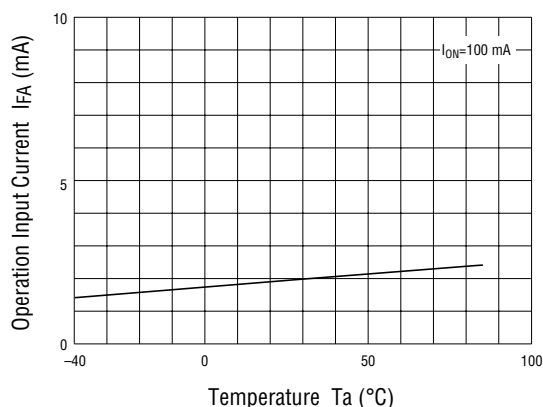
- Derating Factor of Continuous Forward Current



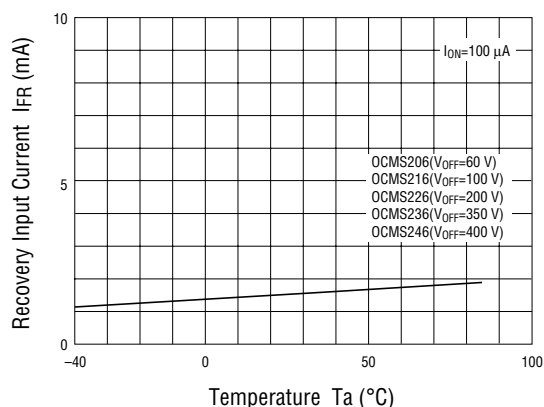
- Derating Factor of Load Current



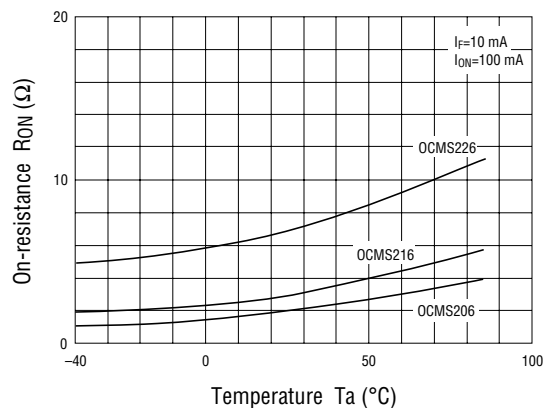
- Operation Input Current vs. Ambient Temperature



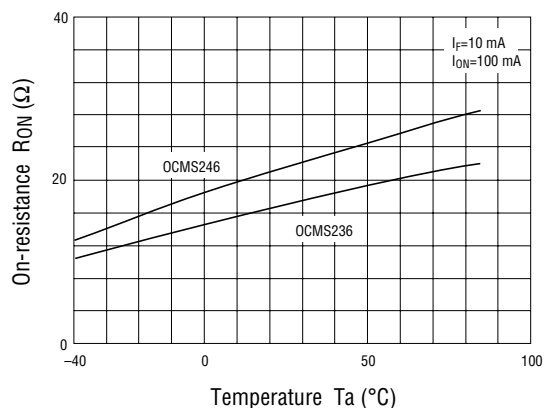
- Recovery Input Current vs. Ambient Temperature



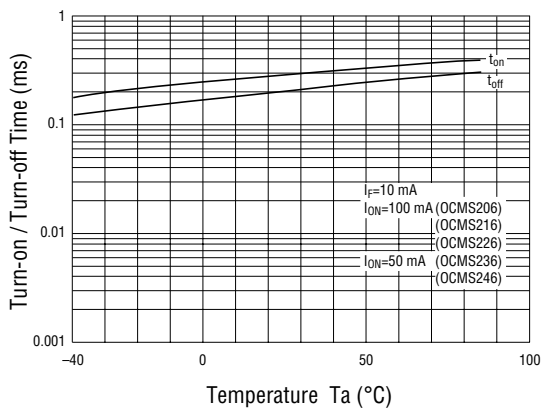
- On-resistance vs. Ambient Temperature 1



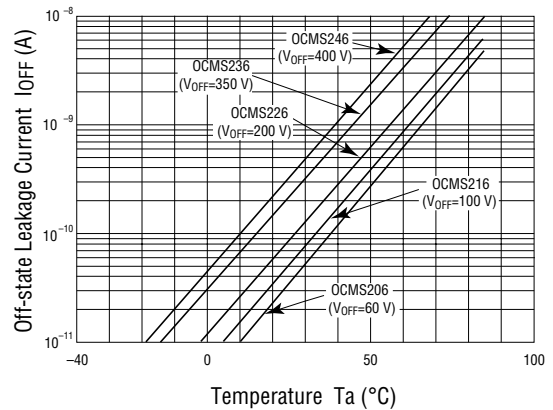
- On-resistance vs. Ambient Temperature 2



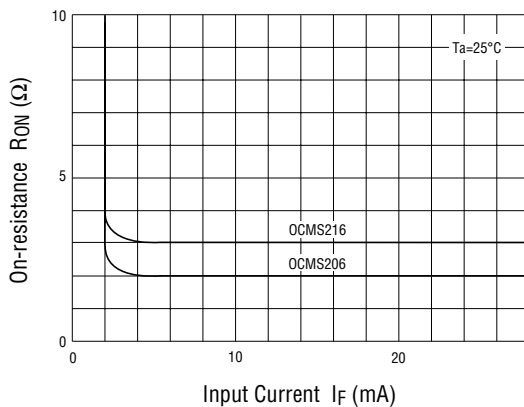
- Turn-on/Turn-off Time vs. Ambient Temperature



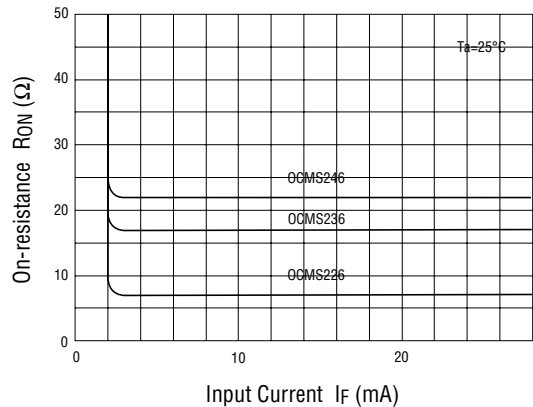
- Off-state Leakage Current vs. Ambient Temperature



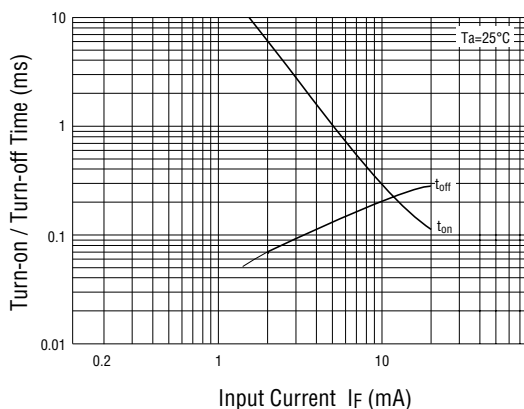
- Output Terminal Capacitance vs. Applied Voltage



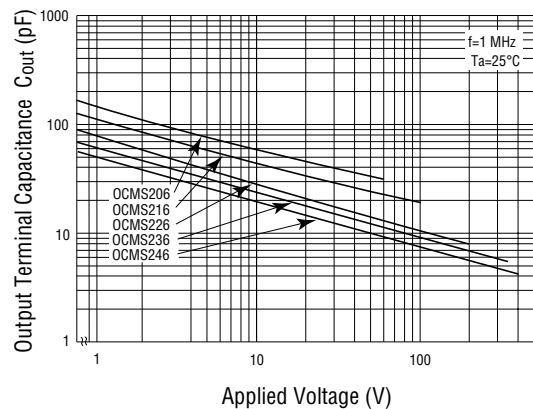
- Continuous Forward Current vs. Turn-on/Turn-off Time



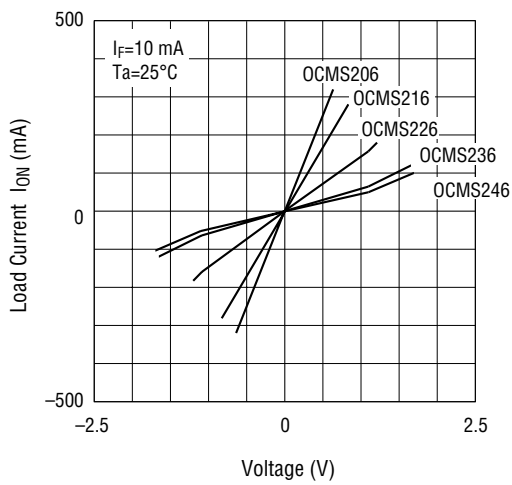
- Output Terminal Capacitance vs. Applied Voltage



- Continuous Forward Current vs. Turn-on/Turn-off Time



- Load Current vs. Voltage



- Example Circuit for Measuring Turn-on/Turn-off Time

